

October 1957

Metal
Products
Manufacturing

including finish

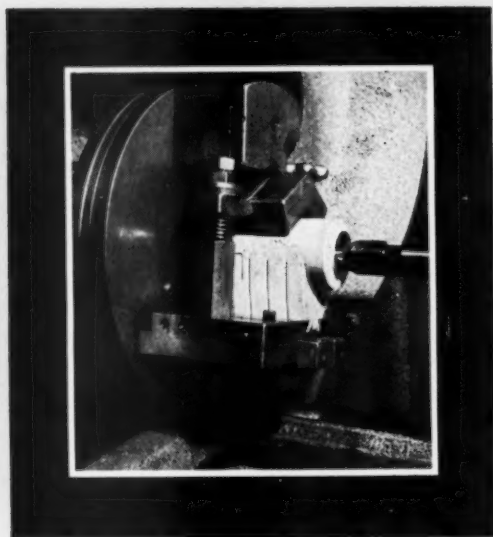
SERVING THE
Appliance AND

FABRICATED METAL PRODUCTS INDUSTRY

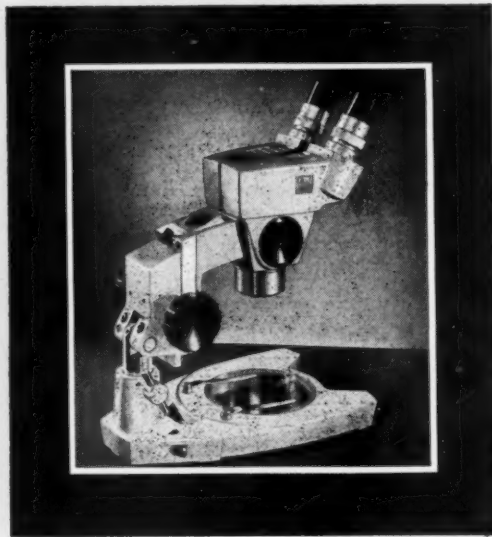
FROM RAW METAL TO FINISHED PRODUCT

EPON[®] RESIN does it !

Protects precision optical instruments
from abrasion and perspiration acid



AO Microscope body with Epon finish is chucked, faced to size, bored, reamed and threaded. Yet the tough Epon finish comes through without a nick or scratch.



A smooth coating of Epon resin-based paint protects AO Stereoscopic Microscopes from abrasion, chemical deterioration and mechanical impact.

Here's how:

At the American Optical Company, Instrument Division, painted castings for scientific and ophthalmic instruments frequently are machined after the finish has been applied. What happens to the finish? *Nothing.* Why? It is protected by the amazing abrasion-resistance of Epon resin-based coatings.

But scuff-resistance is only part of the story. Customer complaints about perspiration acid peeling the coatings on instruments presented

another very serious problem.

To counteract this problem, AO chemists put an Epon resin-based paint to the test. Castings with 2 coats of Epon resin-based paint and others with 2 coats of ordinary paint were immersed in the same solution of 5% sodium chloride, 5% acetic acid, 3% isovaleric acid, 3% butyric acid and water for 96 hours. Result: holes had formed in the ordinary paint finish. The Epon resin coating . . . *still in flawless condition.*

If you have a coating problem, Epon resin-based paint may be your answer. Its unsurpassed abrasion- and chemical-resistance makes it an *ideal all-purpose* industrial coating.

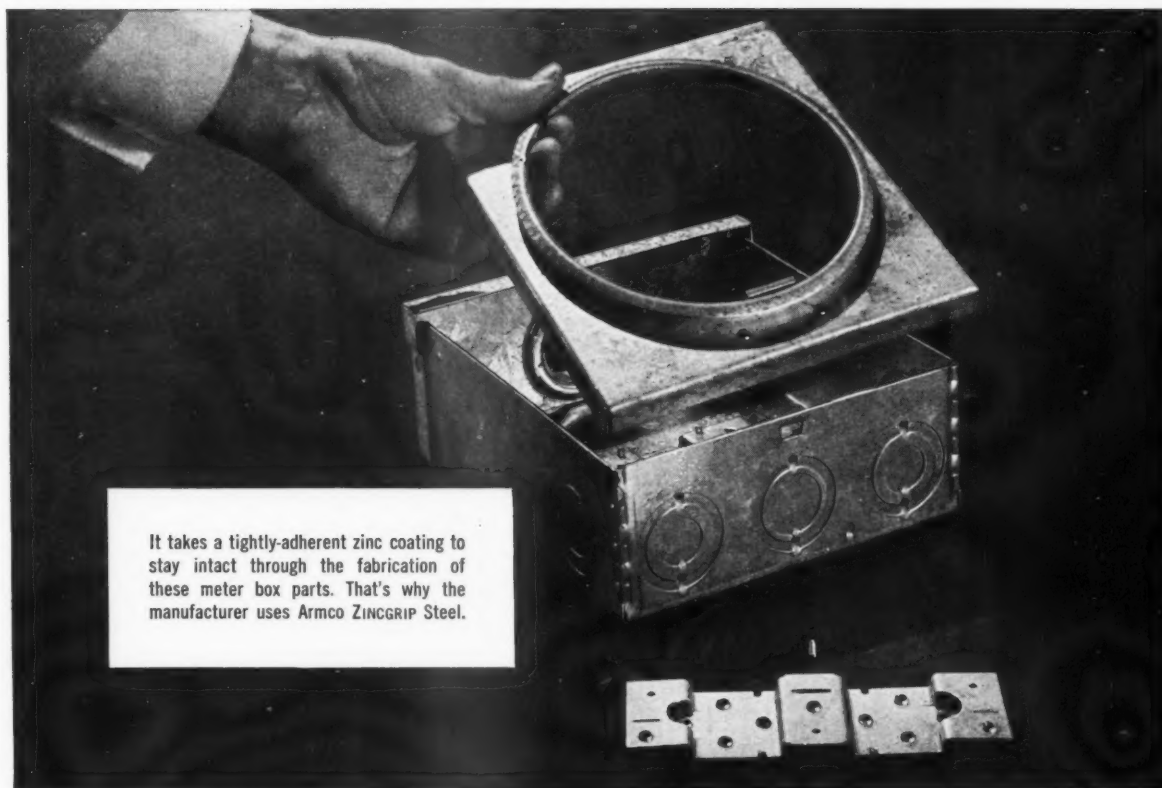
Call Shell sales offices for names of suppliers. Write for the Epon resin coatings story, "Planning to Paint a Pyramid?" You'll find it interesting and informative.

Epon resins are the epoxy polymers made exclusively by Shell Chemical Corporation.

SHELL CHEMICAL CORPORATION
CHEMICAL SALES DIVISION, 380 Madison Avenue, New York 17, New York

Atlanta • Boston • Chicago • Cleveland • Detroit • Houston • Los Angeles • Newark • New York • San Francisco • St. Louis
IN CANADA: Chemical Division, Shell Oil Company of Canada, Limited • Montreal • Toronto • Vancouver





It takes a tightly-adherent zinc coating to stay intact through the fabrication of these meter box parts. That's why the manufacturer uses Armco ZINCGRIP Steel.

When You Use Armco ZINCGRIP Steel:

SEVERELY-WORKED PARTS STAY ZINC-PROTECTED

Parts of this electrical meter box are tough fabricating tests for any steel. But what's remarkable is that they are fabricated from zinc-coated steel!

Because it is Armco ZINCGRIP®—ductile steel with an exceptionally tight hot-dip coating of zinc—there is no flaking or peeling of the protective zinc coating. It takes as severe a draw as the base metal.

This kind of performance is standard for Armco ZINCGRIP Steel. The continuous hot-dip zinc-coated steel, it has a record of more than 21 years' service in hundreds of manufacturing plants.

Experience has also shown that Armco ZINCGRIP Steel can save money by replacing many parts that formerly required costly painting or plating for protection from rust.

If you have avoided using zinc-coated steel because your product parts require severe fabrication, let us give you more information about this special steel that *stays zinc-protected even when severely worked*. Just fill in and mail the coupon, or call your nearby Armco Sales Office.

ARMCO STEEL CORPORATION

2067 Curtis Street, Middletown, Ohio

Send complete information on Armco ZINCGRIP Steel

We make _____

Name _____ Title _____

Firm _____

Street _____

City _____ Zone _____ State _____

ARMCO STEEL CORPORATION

2067 Curtis Street, Middletown, Ohio

Sheffield Steel Division, Armco Drainage & Metal Products, Inc., The Armco International Corp.



WESTINGHOUSE another user of PERMA-VIEW WINDOWS

Westinghouse—another leading appliance name using the leading oven-door window—PERMA-VIEW. Westinghouse—one of the 57 leading range manufacturers using PERMA-VIEW.



ROUND



SQUARE

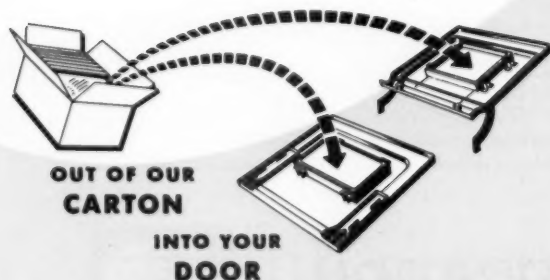


RECTANGULAR



TRAPEZOID

We can manufacture any shape, any size, any thickness to meet your engineering requirements. Alternate methods of attachment may be used.



Westinghouse has been a satisfied user of PERMA-VIEW windows for a number of years. Now 57 other leading manufacturers are using "the window you can see through always."

The strong, steel-encased, double-pane PERMA-VIEW window incorporates the finest quality heat resisting glass. It is mechanically sealed to prevent infiltration of vapors and to eliminate "fogging." This "No-Fog" window meets the constantly growing demand for "visible baking."

The PERMA-VIEW window is pre-engineered and comes to you ready for immediate installation in your range, "out of our carton into your door." Let our specialized production lines serve as a part of your sub-assembly facilities. Phone or write us for complete details on the ease and economy of adding this sales feature to your new ranges.



MILLS PRODUCTS INCORPORATED

1015 WEST MAPLE ROAD

WALLED LAKE, MICHIGAN

October • 1957

VOL. 14 • NO. 10

MPM

(including finish)

MONTHLY TRADE PUBLICATION

Established January 1944

Published by

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METAL PRODUCTS MANUFACTURING

FROM RAW METAL TO FINISHED PRODUCT

A trade publication devoted to the interests of the metal products manufacturing industry with special editorial attention to home appliances. The editorial scope covers design, engineering, market and statistical information and technical and practical information on plant facilities and all phases of manufacturing "from raw metal to finished product." Free controlled circulation to top management, purchasing, engineering and key plant management and supervision in metal product manufacturing plants. To others, subscription price is \$8.00 per year, domestic. To all other countries \$10.00 per year (U.S. funds). Single copies, \$1.00.

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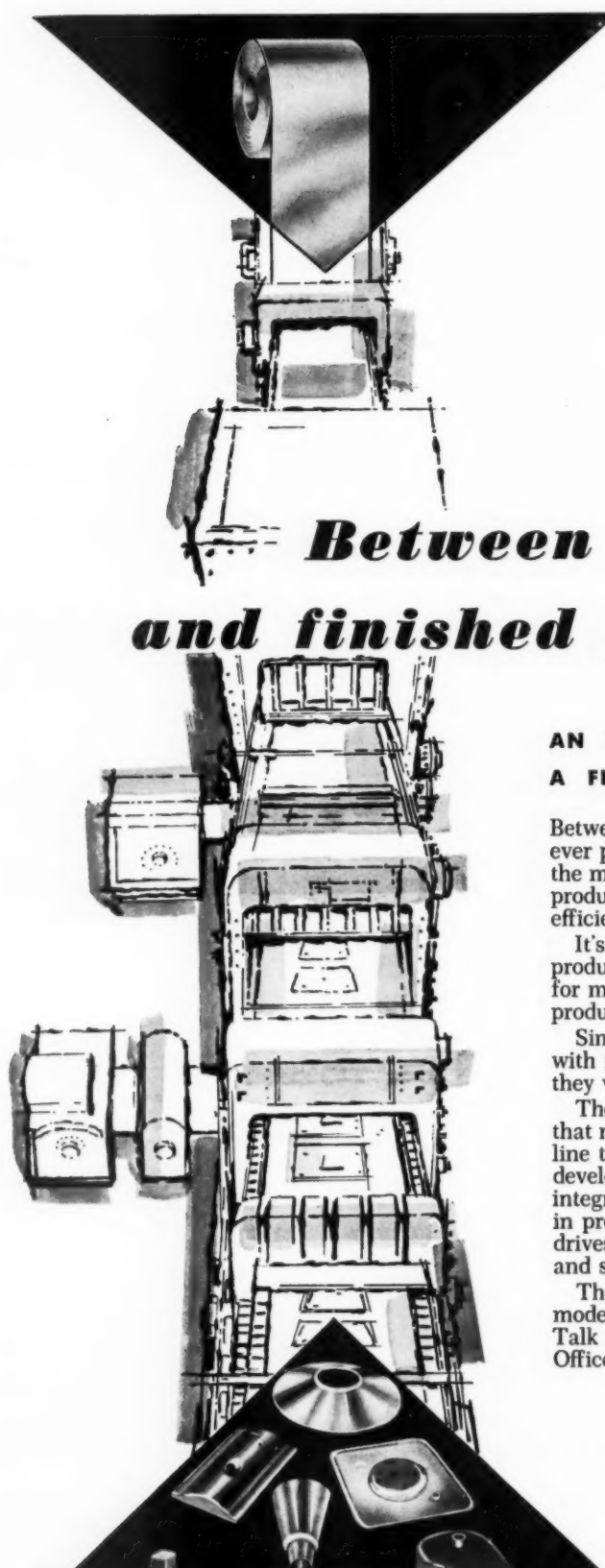
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authorized January 7, 1940.



***Between material
and finished part...***

**AN IDEA THAT MAKES SENSE —
A FEDERAL-WARCO PRODUCTION LINE**

Between material and finished part is the ever present problem of bringing together the machinery necessary to perform all production operations as speedily and efficiently as possible.

It's here, the Federal-Warco, this packaged production line has proved to be the answer for many of the nation's foremost production experts.

Simply provide Federal-Warco engineers with material and part information and they will develop a line to do the job.

The advantages: One source responsibility that means faster, more thorough service; a line that is 100% harmonic, all stations developed especially to work in synchronization; integrated and automated handling of work in process; the possibility of utilizing common drives and bases, reducing operating costs and saving valuable floor space.

There is much more. Why not look into this modern method of production line manufacture? Talk to your Federal-Warco representative. Offices in all leading industrial areas.

Federal / Warco
PACKAGED
PRODUCTION LINES



WHY WEIRZIN®?

"It resists rust, forms easily and holds paint."

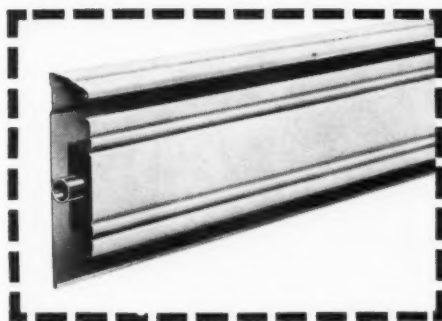
So reports the Vulcan Radiator Company, Hartford, Connecticut.

"We must bend Weirzin electrolytic zinc-coated steel like a pretzel in producing our high quality Trimline baseboard radiators. Weirzin goes right along with us—doesn't balk one bit. Our finished baseboard radiators have a constant flow of bends and turns. But in forming them, not one speck of Weirzin's protective zinc coat flakes or peels off. This assures us that recoating of our radiators is a thing of the past and that rust is a real 'goner' having no bare steel to feed upon. And, chemically treated Weirzin takes and keeps paint as if it were the natural thing to do. A decided advantage over other metals that can 'take' paint but don't hold it all."

That's Weirzin electrolytic zinc-coated steel sheets! They never give rust a start, thereby eliminating any future corrosion problem. They have a natural paint bonding surface which means the end product has a beautifully painted finish that will fit into any décor. They have the strength of their steel base which means a longer life of worry-free service.

What better characteristics could any product have to meet the exacting demands of manufacturers everywhere.

See how Weirzin can meet your requirements—better! Just write Weirton Steel Company, Dept. R-26 Weirton, West Virginia, for your free informative booklet.

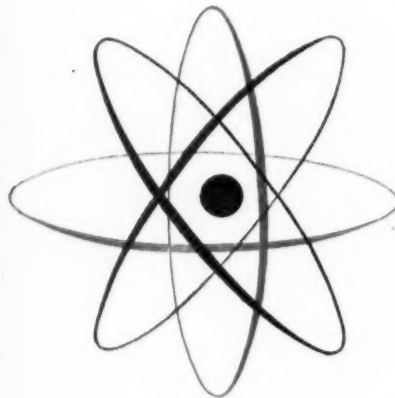


**WEIRTON STEEL
COMPANY**

WEIRTON, WEST VIRGINIA
a division of



FROM VITRO —another example of research at work for you...



**Low-temperature
CHALKBOARD ENAMELS**
for application on aluminum, steel
or aluminized steel

Another exclusive Vitro development, these enamels are unusually durable and very economical. They can be fired over a wide range of temperatures; assure easier gloss control; and offer excellent coverage. On aluminum and aluminized steel a one-coat application is sufficient.

Other advantages provided by Vitro enamels are: good looks, a superior writing surface, and exceptional wear resistance. Actually, they retain their matte finish indefi-

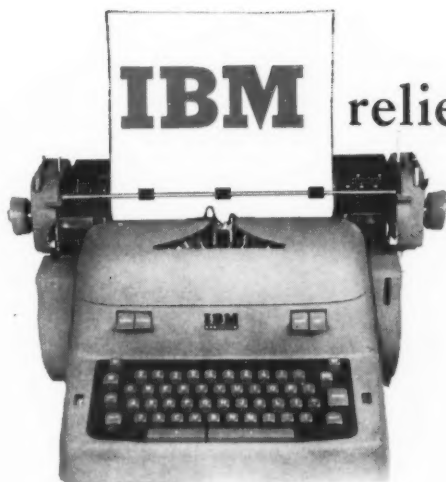
nitely. They're available in solid blacks, yellows, whites and greens, and also in pastel shades.

For more information on Vitro Chalkboard Enamels, ask your Vitro representative, or write us. There's no obligation.

Although called "chalkboard" enamels, these colors, with a slight change in composition, can be utilized for coloring architectural panels to give a long-lasting matte or semi-matte finish.



VITRO MANUFACTURING COMPANY • 60 Greenway Drive, Pittsburgh 4, Pa.
A Division of Vitro Corporation of America • West Coast Plant: 1625 West El Segundo Blvd., Compton, Cal.



IBM relies on **RANSBURG**
NO. 2
PROCESS
Electrostatic
Spray Painting

to get the excellent
 and uniform high quality wrinkle finish on all

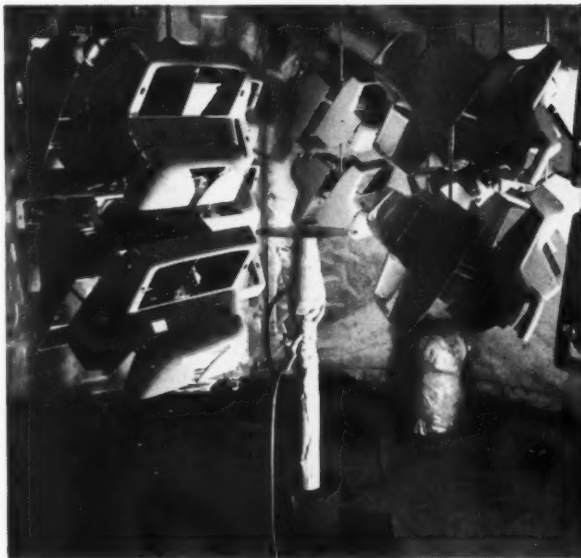
IBM ELECTRIC TYPEWRITERS

IBM's strict quality standards are easily maintained with Ransburg No. 2 Process in the painting of Electric Typewriter parts. Rejects by the former hand spray method used to run as high as 30% on some parts. Now, with automatic Electro-Spray, rejects for all reasons are only 3% to 5%.

Three Times as Many Pieces per Gallon!

Along with increased production, paint mileage is stepped up, and they get three times as many pieces per gallon as by the former hand spray method. That's because efficiency of the Ransburg No. 2 Process Reciprocating Disk puts the paint where it's supposed to go . . . on the parts.

Want to know how Ransburg Electro-Spray can improve the quality of your painted products . . . and at the same time, cut your paint and labor costs? At no obligation to you, we will make complete laboratory tests with your products to prove the advantages and cost saving benefits which can be yours with Ransburg No. 2 Process. Write or call.



Both prime and finish coats are uniformly applied to IBM Electric Typewriter cases as they rotate around the floor-mounted Ransburg No. 2 Process reciprocating disks. Automatic Electro-Spray provides three times as many pieces per gallon as by former hand spray.

Ransburg

ELECTRO-COATING CORP.

Indianapolis 7, Indiana

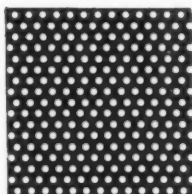
RANSBURG

THE **MPM** **spotlight**

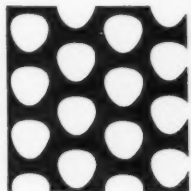
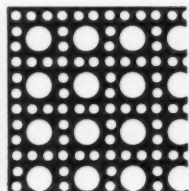
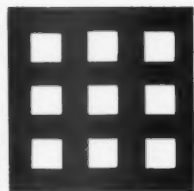
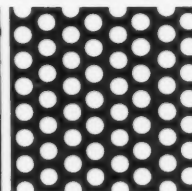
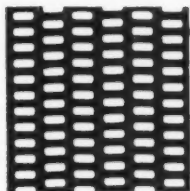
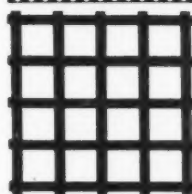


A high speed automatic cold injector that chills food quickly, and offsets cold loss from door openings, is said to head the list of features on 1958 Westinghouse refrigerators. Model DCL-16 is a combination refrigerator-freezer which has a "child safe" magnetic door on the 10.4 cubic foot refrigerator section, and an equally safe burst open latch on the 5.7 cubic foot freezer compartment.

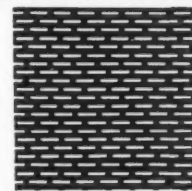
Round
Holes



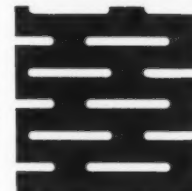
Square
Holes



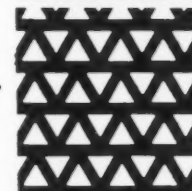
Slots



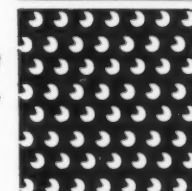
Oblong
Holes



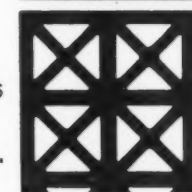
Triangles ..



Decorative
Designs...



In
Thousands
of
Patterns...



H & K Perforated Materials

mean

UTILITY · BEAUTY · ECONOMY

for

TOMORROW'S PRODUCTS

A MEDIUM OF LIMITLESS APPLICATIONS

Harrington & King perforated materials offer a challenge to men of ideas. Designers and stylists are discovering an ever-increasing range of applications for perforated materials. For functional or decorative purposes, or where a combination of both is essential, H & K perforated materials are used in more products, in more accessories, in more places than ever before.

REDUCES TOOLING COSTS

The design, pattern and open area for almost every application may be selected from our thousands of perforating dies . . . at no charge for tooling. (If a special design is required, tools will be built to order.) In addition to the savings in tool costs, the perforating process itself is an economical method.

MATERIALS PERFORATED BY H & K

Harrington & King can perforate practically any material that can be obtained in coils, sheets or plates . . . from foil-thin to 1" thick. Metallic materials—steel, aluminum, stainless steel, brass, copper, monel, zinc, bronze, etc. Non-metallic materials—plastics, wood composition, paper, cloth, etc.

H & K engineers will be pleased to work with you on your requirements.

FILL-IN AND MAIL COUPON TO THE NEAREST H & K OFFICE

THE **Harrington & King**
PERFORATING CO., INC.

CHICAGO
5640 Fillmore Street
Chicago 44, Illinois

NEW YORK
116 Liberty Street
New York 6, N. Y.

Please send me ☐ GENERAL CATALOG NO. 62
☐ FOLDER OF DECORATIVE PATTERNS

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COMPANY _____

STREET _____

CITY _____ ZONE _____ STATE _____

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H & K patterns—use this coupon**

you're **SAFE**



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RELY on GI

Fractional H. P. Motors

1/40 H. P. to 1/1100 H. P.

Your product is only as good as the motor that powers it. Play it safe by specifying the choice of leading O.E.M.'s — *Specify G.I.I* We have the complete manufacturing facilities and vital know-how to handle your particular job efficiently, economically, on time. Our design staff will be happy to work with your engineers to solve special fractional hp. problems. You can rely on G.I.I

Write for complete specifications and quantity-price quotations today!



MODEL B
4-pole, 4-coil shaded pole AC Induction Type



MODEL A
2-pole, shaded pole AC Induction Type



MODEL O
2-pole Capacitor Reversible Type AC only (for 6, 12, or 24 volts)



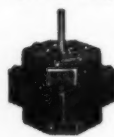
MODEL C
2-pole, shaded pole AC Induction Type



MODEL F
2-pole, shaded pole AC Induction Type



MODEL E
4-pole, shaded pole AC Induction Type



MODEL D
4-pole, 4-coil, shaded pole AC Induction Type



THE GENERAL INDUSTRIES CO.

DEPT. GF • ELYRIA, OHIO

INDUSTRY MEETINGS

AMERICAN GAS ASSOCIATION

American Gas Association's 39th Annual Convention, St. Louis, Mo., October 7-9.

INDUSTRIAL HYDRAULICS

National Conference on Industrial Hydraulics, Armour Research Foundation & Illinois Institute of Technology, Hotel Sherman, Chicago, October 17-18.

PACKAGING AND HANDLING

Twelfth National Industrial Packaging and Handling Exposition, Convention Hall, Atlantic City, N. J., October 28-30.

HOME LAUNDRY

Eleventh National Home Laundry Conference, Mayflower Hotel, Washington, D. C., November 1-2.

PAINT & VARNISH PRODUCTION

Thirty-fifth Annual Meeting of the Federation of Paint and Varnish Production Clubs, Bellevue-Stratford hotel, Philadelphia, Pa., November 1-2.

METALLURGICAL

American Society of Metals' 2nd World Metallurgical Congress, Chicago, November 2-8.

PEI SHOP FORUM

Porcelain Enamel Institute's 19th Annual Shop Practice Forum, Ohio State University, Columbus, Ohio, Nov. 6-8.

ELECTRICAL MANUFACTURERS

National Electrical Manufacturers' Association Annual Meeting, Traymore Hotel, Atlantic City, N. J., Nov. 11-15.

AIR POLLUTION

Air Pollution Conference, co-sponsored by Armour Research Foundation and Midwestern Air Pollution Prevention Association, Chicago, Nov. 13-14.

REFRIGERATING ENGINEERS

The American Society of Refrigerating Engineers Semi-Annual Meeting, Shoreland Hotel, Chicago, Nov. 14-16.

AIR CONDITIONING

Tenth Air Conditioning & Refrigeration Exposition, International Amphitheatre, Chicago, November 18-21.

IN KITCHEN ACCESSORIES, TOO

Sharonsteel Quality STANDS OUT

• Many different types of steel are required in the manufacture of kitchen accessories. — Stainless Steels for trim and assemblies that come in contact with foods — Alloy Steels for parts that must absorb punishment — Carbon Steels for cutting blades, frames and cases. The ability to constantly produce a wide variety of quality steels is another reason why Sharon has always been a leading supplier to this ever expanding industry.



SHARONSTEEL

*For 56 Years
a Quality Name
in Steel*

SHARON STEEL CORPORATION, SHARON, PENNA.

CHICAGO, CINCINNATI, CLEVELAND, DAYTON, DETROIT, GRAND RAPIDS, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, NEW YORK, PHILADELPHIA, ROCHESTER, SAN FRANCISCO, SHARON, SEATTLE, MONTREAL, TORONTO



Latex paints for metal cut fire hazard

You'll solve a lot of plant problems when you switch to metal finishes made with latex.

In the first place, you'll reduce fire hazard and may lower your insurance rates because, in these modern paints, water replaces flammable thinners. You'll eliminate disagreeable paint odors. You'll effect safer, more pleasant working conditions with latex metal paints.

And you needn't worry about rust resulting from the water

thinner. These latex paints for metal will not cause rusting. Moreover, a latex paint system will fit easily into your present shop set-up without heavy investment in new equipment. Check your industrial finish supplier now.

THE DOW CHEMICAL COMPANY,
Midland, Michigan, Plastics
Sales Department 1849UU-1.



YOU CAN DEPEND ON



Dow makes paint raw materials

The Dow Chemical Company does not make paint but has been for years a major supplier of many basic raw materials used by the paint industry. In 1946, Dow introduced the first latex for the manufacture of paint and since that time has worked closely with the paint industry in developing new paint products based on a series of Dow latexes.

Water-thinnable latex paints—a growing market

Since the first successful latex paint was developed for application to interior walls, the use of latex in paints of this type has increased tremendously. In step with this rapid growth, The Dow Chemical Company and the paint industry have long conducted research on the application of latex for paints and finishes in the industrial field.

Latex metal finishes—product of intensive research

Because latex paints are water-thinnable, there were many problems to be solved before the excellent properties inherent in Dow latex could be successfully applied in the metal finishing field. But these problems were met and solved. Then followed extensive tests in the laboratory and field. Now the results are in . . . water-thinned latex finishes for metal are a reality.

Latex basic to many metal finish applications

The primary research on latex finishes done by Dow and carried into complete paint formulations by metal finish manufacturers, can now be applied to specific product requirements of the industrial finish user. Since each consumer of industrial finishes will have very specific requirements, it now remains for the paint supplier to provide specific formulations based on latex for each application. Dow suggests that you work closely with your industrial finish supplier in developing finishes to your specifications based on this important new raw material, Dow latex.

THE DOW CHEMICAL COMPANY
Midland, Michigan



likes Spencer article

Gentlemen: You had, in the October through January issues, featured the article, "Formability of Metals" by Lester F. Spencer. If at all possible, I should like to have tear sheets of the entire article, or failing that, I would appreciate any information that would enable me to obtain reproductions of the article.

Please bill us for any charges for this service.

T. W. Ragan
Engineer, General Services
Department 361
Western Electric Company
Indianapolis Works
Indianapolis 6, Ind.

article interesting

Gentlemen: We are anxious to obtain a copy of the following article: "How the Safe Transit Tests Correlate with Packaged Product Shipments. Bisbee, R. F." Finish, vol. 12, Sept., 1955, pp. ST5-ST8.

We would appreciate it very much if you could arrange to furnish us with a copy, and we shall be more than glad to make payment for this service.

A. F. Pyles
Packaging Institute
New York 17, N. Y.

June issue of value

Gentlemen: If at all possible, may we request two additional copies of your June, 1957 publication, METAL PRODUCTS MANUFACTURING. There is an article therein in which we are very interested, and should like the additional copies for our use.

F. E. Evans
Vent-A-Hood Co.
Dallas 19, Texas

Ed. Note: Supply of June issues exhausted. Will send tear sheets.

Vanden Berg article interesting

Gentlemen: We have the August edition of METAL PRODUCTS MANUFACTURING and find the article "A Study of the Characteristics of Anodized Aluminum," page 42, etc., to be of considerable interest.

If it is possible, we would like to obtain three (3) additional copies of this very fine article.

A. A. Wright, Vice President
The Meaker Co.
Chicago 50, Ill.

Ed. Note: Three tear sheets have been mailed.

Another Vanden Berg booster

Gentlemen: We read with great interest

"A Study of the Characteristics of Anodized Aluminum," by R. V. Vanden Berg, which appeared in your August issue. We would appreciate receiving 30 copies of this article. If there is any charge, this letter can be your authority for billing.

A. M. Gurley
Northwest Chemical Co.
Detroit 4, Mich.

Grateful for publicity

Gentlemen: Thank you very much for the interesting writeup on our new Chico Portomatic Dishwasher, which appears on page 27 of your August issue. We are delighted to see this publicity on our new product, which is generating a tremendous amount of national enthusiasm and interest.

Our sales organization can use six additional copies of this issue to good advantage. Do you have any extras which you can spare?

Stuart K. Choate
Chico General Products Corp.
San Francisco 5, Calif.

Ed. Note: Six copies are on the way via parcel post.

Uses MPM frequently

Gentlemen: We receive a free copy of METAL PRODUCTS MANUFACTURING which we use very frequently. We have decided that our copies are of enough value to be bound. We do not have complete sets of the years 1953 and 1947. Could you send us copies of FINISH for March 1953, June 1947, and July 1947 so we may have these issues bound. Thank you for your cooperation in this matter.

(Mrs.) Mildred B. Harris
Technical Librarian
Armco Steel Corp.
Middletown, Ohio.

Interested in dishwasher

Gentlemen: In the New Products Department of your August issue we read a report on a portable automatic dishwasher manufactured by The Chico General Products Corporation. As we are very interested in this new appliance, we request you to kindly let us know the address of the above manufacturer.

Raad van Beheer
De Ema N. V.
Breda, Netherlands

Ed. Note: The Chico General Products Corp. is located at 525 Market St., San Francisco 5, Calif.

Norge head sends thanks

Gentlemen: Thanks for your interest in including Norge in the special section in the September issue of METAL PRODUCTS MANUFACTURING publication.

Judson S. Sayre, President
Norge Sales Corp.
Subsidiary of Borg-Warner Corp.
Chicago, Ill.

THE finish LINE



OPINIONS FROM THE FIELD..... will be brought together on this page in brief for quick comparison of recent statements by three leaders in the appliance and "metals" field.

As steel goes, so goes the country?

In a recent statement before a publishers' group, L. S. Hamaker general manager sales, Republic Steel said that, "American business has never faced a brighter future". However, he said the slogan, "as steel goes, so goes the country", should be reversed to indicate that the well-being of the steel industry is an accurate reflection of the well-being in all other industries.

"We measure the future outlook for our business by studying in detail the outlook for the major industries that consume steel," Hamaker said.

Hamaker examined the electric utilities and pointed out that \$32 billion were spent by that industry for the expansion of its facilities. The estimate for expansion during the next decade is \$60 billion.

"The multitude of devices to consume this power must keep pace with the growth in power generation," Hamaker said, and indicated additional tonnages to be used for the electrical appliance equipment.

He next examined the construction business and indicated that the temporary leveling off in the construction business will give way to another boom.

"Total new construction last year reached \$44.3 billion. By 1965, that figure should approach \$65 billion. Housing must be provided by that time to accommodate seven million new families. Demolition for slum clearance and freeway construction is running at the rate of 300,000 units. This will be stepped up to 400,000 units. That's a lot of housing to be replaced," he said.

Industry "wrote off the independent dealer"

Harold P. Bull, vice president of distribution for Norge, hits hard at the appliance industry's "mass distributor tactics" and cites failure "in its primary responsibility to create sales at the consumer level".

The industry launched a concept of "automatic distribution which, translated, meant pre-selling the consumer by heavy advertising, subsidizing big department stores, discount houses, and large volume dealers," Bull said.

"... it wrote off the independent dealer as a mere 'way station' on the transmission belt from factory to consumer."

Bull said that the legion of small and medium sized dealers built the appliance business and still represented its long-term strength.

"Suddenly, in some segments of industry, and particularly in the appliance industry, has come the realization that too many people charged with responsibility for selling, have been 'sitting expectantly on our hands'. Suddenly, the cure-all of the past year for solving the problem of over-

capacity with lower and lower prices, has run its course. The mass marketers find that their pet theories of distribution have bogged down.

"Certainly they come up with rationalizations. The refrigerator market is saturated (*yet, twenty-five million refrigerators are ancient and obsolete*) . . . the economy is moving sideways, away from consumer durables (yet, every survey shows that increasing millions of people intend to buy a new refrigerator, washer, dryer, range, air-conditioner) but the truth is that in too many places person-to-person selling of benefits and advantages built into our marvelous products has practically vanished."

We wonder who wants to debate the underlined portion of the last sentence . . . or must we admit that Mr. Bull is 100% right?

What about gas appliances?

At a recent Pacific Coast Gas Association meeting, gas appliance manufacturers, reporting on the outlook for their products, estimated the American consumer will purchase approximately 300,000,000 gas appliance units of all types during the next seven years.

At the same time industry leaders warned that appliance sales will never come easy, but only through a sharpening of creative salesmanship — "*an art that declined during the years of World War II and is only now experiencing a nation-wide revival.*"

At this same meeting Harold Massey, managing director of GAMA, pointed out that although gas appliances are fully automatic, appliance sales never will be.

"There is no push-button dial-turning short-cut to selling success," said Massey. "The high quality features of new gas appliances — the most efficient ever produced in the history of our industry — *can be sold to individual customers through hard hitting salesmanship.*"

In these three "capsules" from current statements, we see two sides of a big picture. On the one side Mr. Hamaker presents a snap-shot of the future which would probably get agreement from the majority who study business trends.

On the other side we see a realization that is getting stronger and stronger in the minds and actions of many appliance and metal products producers — that while the "big market" for the future will be upon us, there is no assurance whatsoever that mass sales to the consumer will continue to be automatic.

Our mass production system is here and has been for some time. Our mass distribution system is in sad repair and demands the best efforts of every top sales and management executive in the metal products field.

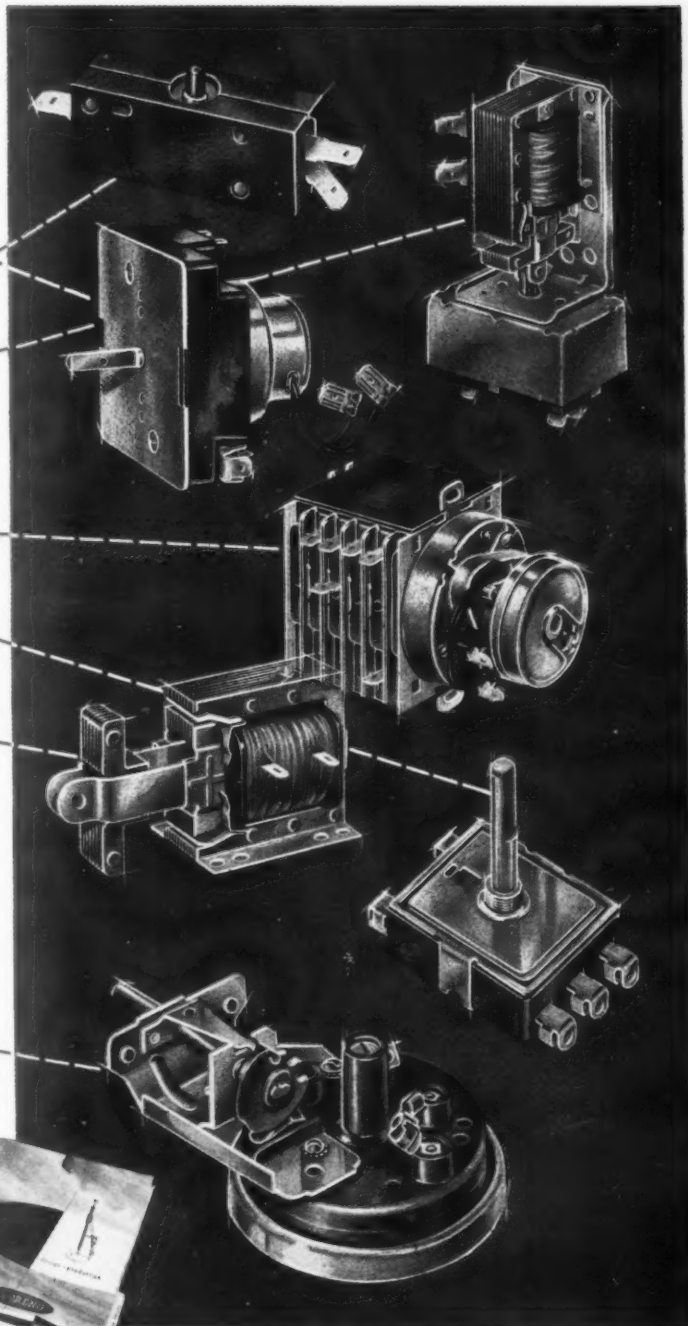
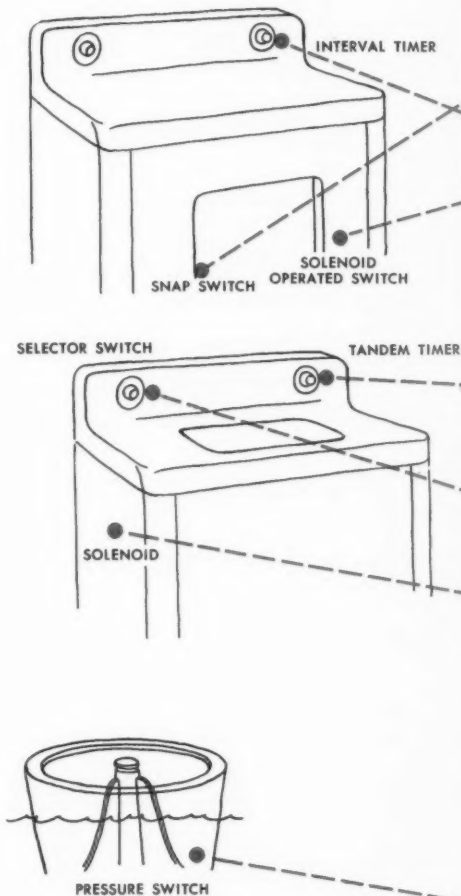
Dana Chase

EDITOR AND PUBLISHER

OCTOBER • 1957 MPM

SERVICE -to help solve your appliance control problems

You include years of Home Laundry Engineering Experience in your products when you specify Soreng electrical components.



Soreng controls can be custom designed to meet your specific requirements at mass production prices.

For complete facts write for your data folder on Soreng Controls.



CONTROLS COMPANY OF AMERICA

SORENG

controls **X** that make modern living possible

• DIVISION

9559 SORENG AVENUE, SCHILLER PARK, ILLINOIS

More home laundry appliances

a continuation of new models as introduced in the
11th Annual Home Laundry Section, September issue



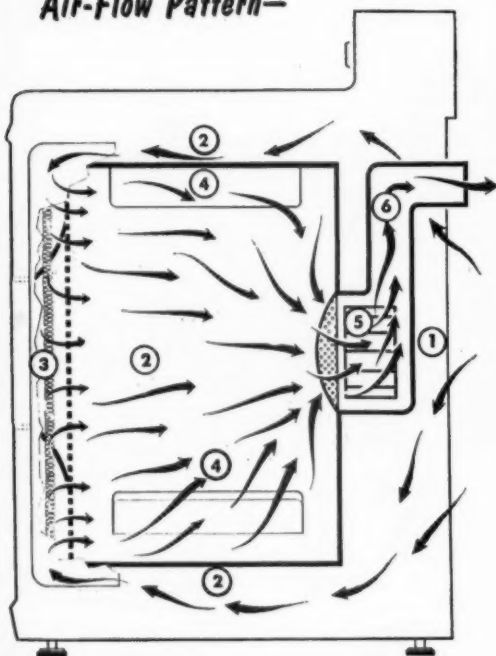
Left: The 1958 Easy Combomatic, model CDH top-of-the-line combination washer-dryer, is a high-styled, prestige combination unit, with a self-illuminated modern design control panel and a front-opening chrome-plated porthole door with convenient, waist-high spring door latch.

Right: The 1958 Westinghouse Space-Mates have push-button washing and drying operation, and offer the homemaker the opportunity to have an automatic washer and electric dryer in virtually any nook of the home. When they are stacked with the dryer atop the Laundromat, they take up only 25 in. of floor space.



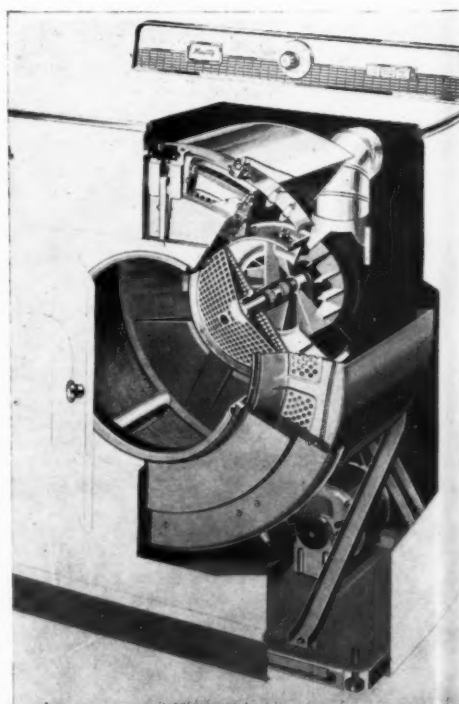
Maytag "halo of heat" dryer

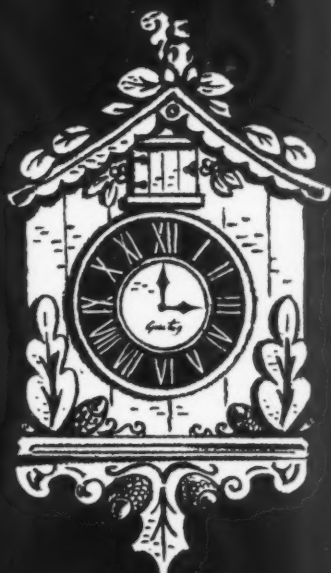
Air-Flow Pattern—



How it works:

1. Room temperature air is drawn into the cabinet through louvers at rear by a newly-designed exhaust fan located directly in back of the dryer drum. It is centered on the drum's axis of rotation and, like other Maytag blowers, it pulls the air through the drying chamber.
2. The movement of air coming into the dryer absorbs the heat given off by the drum and carries it back into the drying chamber. This keeps the dryer cabinet cool and utilizes all heat produced.
3. Air flow is directed to pass over the heating element which is mounted in a large circle between the cabinet front and the front circumference of the drum. (On the gas dryer, model 76 CB, air flow is directed through the combustion chamber where it is heated.)
4. Heated air enters the drum uniformly around its circumference in a halo pattern assuring efficient, even drying.
5. The warm moist air is drawn through the lint disc filter which rotates with the drum. The lint filter is located directly in front of the blower in order to filter 100% of the air exhausted from the dryer.
6. The large 4" exhaust duct permits installation of the dryer up to 30 feet from the exhaust outlet. The dryer can be vented in any of three directions—the back or either side.





1891-1957

66 years
of
HOMMEL
PROGRESS

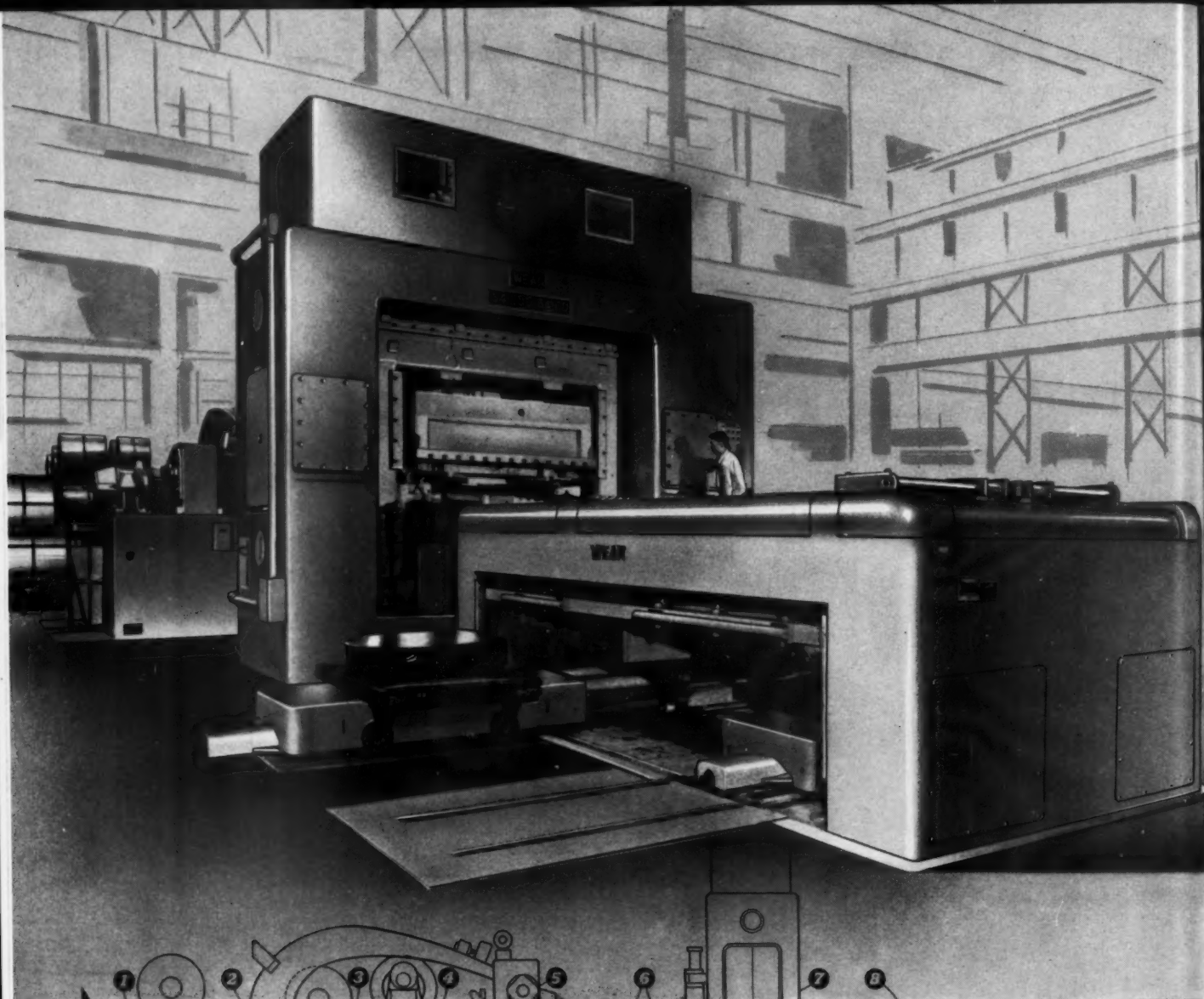
With the passing of time . . . we offer a
toast . . . to our many customers . . .
who have made our 66 years possible.
Through your continued patronage
you have helped us grow . . . Sixty-six
years of progress, through research . . .
is your guarantee of Hommel-Quality products.

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1. Ready stand

2. Threading arms

3. Coil buggy

4. Cone-type Uncoller

5. Leveler

6. Threading tables

7. "Flying-Press"

8. Automatic Piler

"Flying Press" Production Line
250 ton press line
quadruples production
of large
heavy gauge parts

Dramatic proof of new production horizons is seen in the performance of this 250 ton "Flying-Press" production line engineered by Wean. Large heavy gauge automotive parts, formerly produced on modern presses, at rates up to 20 strokes per minute, are now produced on this Wean line at 90 strokes per minute.

The press is a 250-84-60 "Flying-Press." All components, from ready stand to stacking table, were engineered by

Wean to work together as a single unit. Thus, the complete line is capable of producing at maximum press speeds. Consider, for a minute, how such production equipment can lower your per-unit manufacturing costs.


20 tons or 300 tons, whatever your press requirements, you will want the complete story on the "Flying-Press" and related units. Write today for your copy of the Wean "Flying-Press" Brochure.



Equipment Corporation

CLEVELAND 17, OHIO

MACCO BLU- COAT

- the  ideal
between-operation rust
proofing solution -

PREVENTS RUST

RECORDER precision parts are being given the Macco Blucoat Rust Preventive treatment by one of the nation's leading electronic manufacturers.

GEARS, cut, ground and tempered, are treated with Blucoat to prevent rust during storage, shipping, and assembly.

CARBURETOR bodies and large engine castings being treated with Macco Blucoat to prevent rust after machining and during storage.

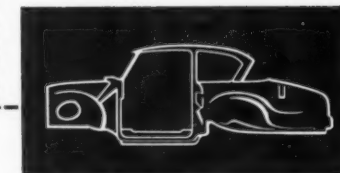
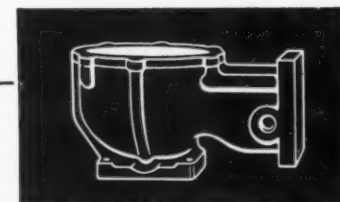
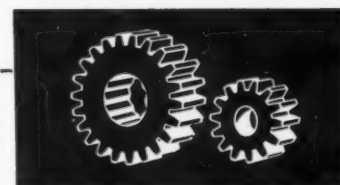
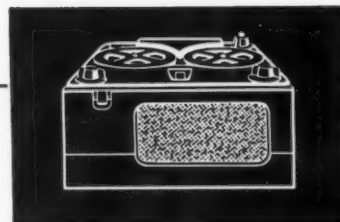
AUTO bodies of some of the world's largest body manufacturers are given the Blucoat treatment to prevent rust after drawing or machining.

5 Reasons for BLU-COAT'S NATIONAL ACCEPTANCE

Macco Blucoat is the amazingly efficient rust preventive used by leading metal processors and fabricating manufacturers everywhere. Endorsed as the only practical method of preventing rust between production operations and assembly—and during transportation and storage.

1. Water soluble—economical, yet extremely efficient.
2. Adaptable to an almost unlimited variety of applications and conditions.
3. Works equally well on steel, cast iron, forgings or die castings.
4. Leaves no oily film. Assures better adhesion. Collects less dust, chips, etc.
5. Blucoat has withstood perfectly a salt spray test of more than 80 hours. Vastly superior to soluble oil. Non-poisonous. No alcohol. Extremely stable.

For the prevention of rust, Blucoat positively has no equal. Whether for the finest of automobile bodies or simply bale tie-wires, Blucoat's versatility makes it most indispensable for any processing plant.



Write today or call a Macco sales engineer

MACCO
PRODUCTS COMPANY

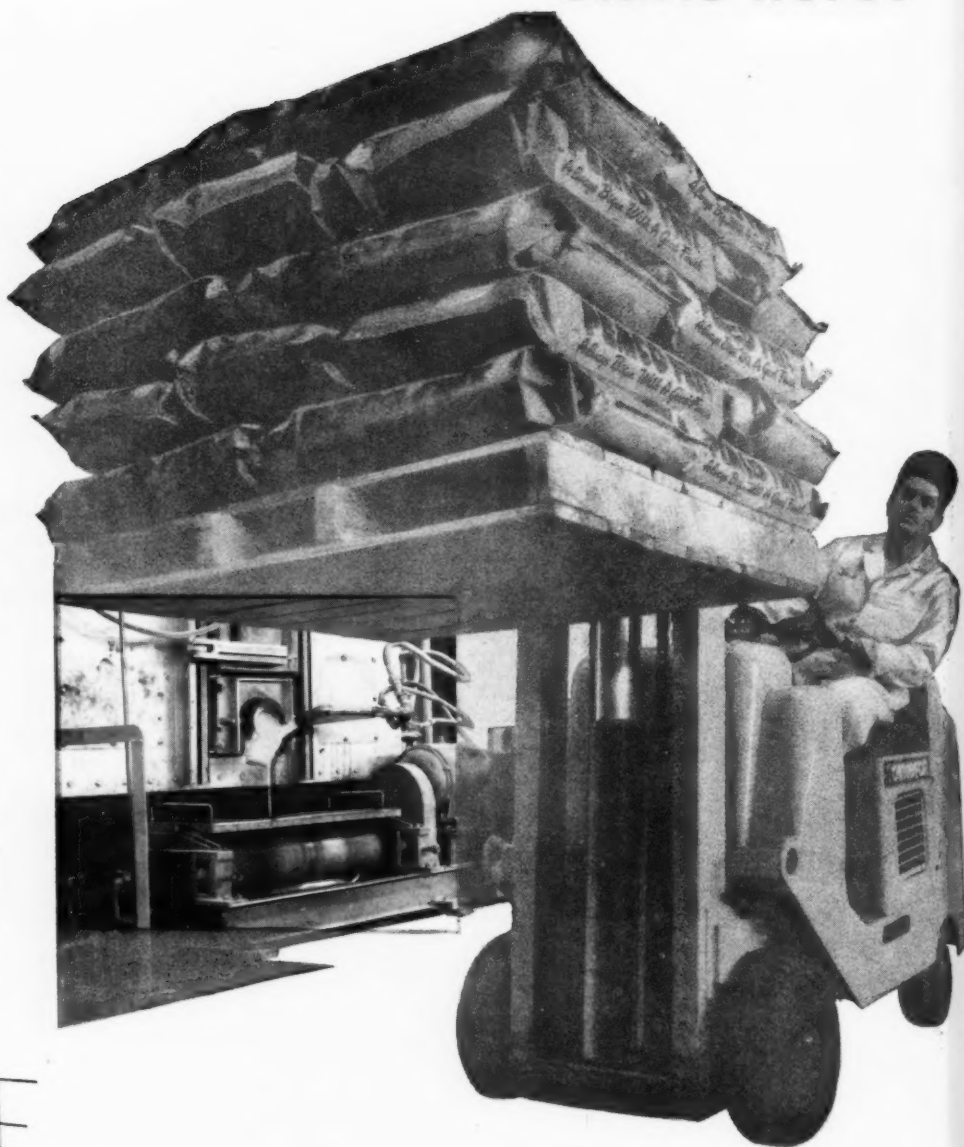
9210 SO. SANGAMON STREET • CHICAGO 20, ILLINOIS

the uniform performance characteristic of

starts here!

Many of the problems you ordinarily would face are minimized . . . sometimes eliminated entirely . . . by Pemco. The uniformity you demand, the results you deserve as a Pemco customer, are assured *before* the frit reaches you. Both time and temperature of Pemco's continuous smelters are automatically controlled at all times. Once a new type of frit is produced—the *exact* same type can be duplicated time and time again.

These exacting, controlled procedures play a vital part in making your enameling operation more profitable.



"PEMCO SERVICE"—a combination of finest performing materials, development assistance, personal attention to your requirements—is available to you through the Pemco Engineer in your area.



corporation
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Manufacturers of "the World's Finest" Porcelain Enamel Frits, Glaze Frits, Coloring Oxides, Screening Pastes, Body and Glaze Stains, Underglaze and Overglaze Colors, Vitrifiable Glass Colors.



See it yourself!

No flaking on Inconel* drop rods after 2 years service

Look at this drop rod. See any scale? There is none. Yet this 3/4-inch Inconel Nickel-Chromium alloy rod has been in continuous 1700°F service better than two years at Kent Corp., Los Angeles.

If you held this rod in your hand, you would notice a thin oxide coating has formed. This coating is very strong and adherent. It doesn't flake off. And this accounts for less spoilage, lower rejections, on enameled

parts fired on Inconel drop rods.

One more point! The simply made drop rod illustrates properties of Inconel alloy that become even more important in complex fixtures or equipment for high temperature service. Strong wrought Inconel alloy keeps its strength at high temperatures; permits you to design for weight saving or increased loading. You'll also find that it is readily fabricated and welded.

Try Inconel alloy, yourself! The Inco booklet, "*Keeping Costs Down As Temperatures Go Up*" pictures and describes many worthwhile ways to take advantage of the properties of this versatile material. We'll gladly send you a copy.

*Registered trademark

The International Nickel Company, Inc.

67 Wall Street

New York 5, N. Y.



INCONEL

FOR LONG LIFE AT HIGH TEMPERATURES

Produces Thin Metal Parts Without Dies

A METHOD for producing thin metal parts without dies or presses is one of the services being offered. The process, known as Photo-Etching, starts with a large, inked drawing of the desired part. This drawing is then photographed onto sheets of sensitized metal up to .016 inch thick. Since the image protects the metal from the action of the etching solution, the parts are readily etched free of the unwanted surrounding metal.

Shapes too intricate for stamping can be made through the process, it is claimed, and close tolerances may be maintained. No burr is left by the process. For complete details, write Dept. MPM, Randolph Co., 1018 Rosine, Houston, Tex.

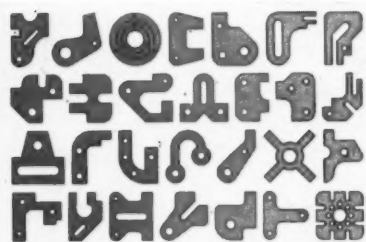
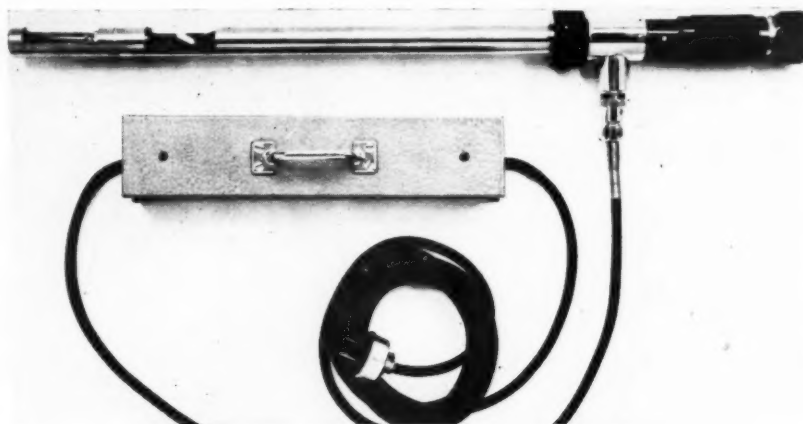


Photo-etching is said to be feasible for short runs and development work.

Borescope Permits Complete Internal Inspection

A NEW borescope permits complete internal inspection of tanks, vessels, combustion chambers, and other equipment by means of an adjustable mirror which can be controlled by a handwheel to permit scanning from retrospective through right angle to forward oblique. The larger field of view offered by the instrument makes it easier to detect any flaws, pits, cracks, or deterioration to assure perfection in manufacturing and maintenance.

The borescope gives a magnification of 10 power, a field of vision of nine inches in diameter at a distance of 24

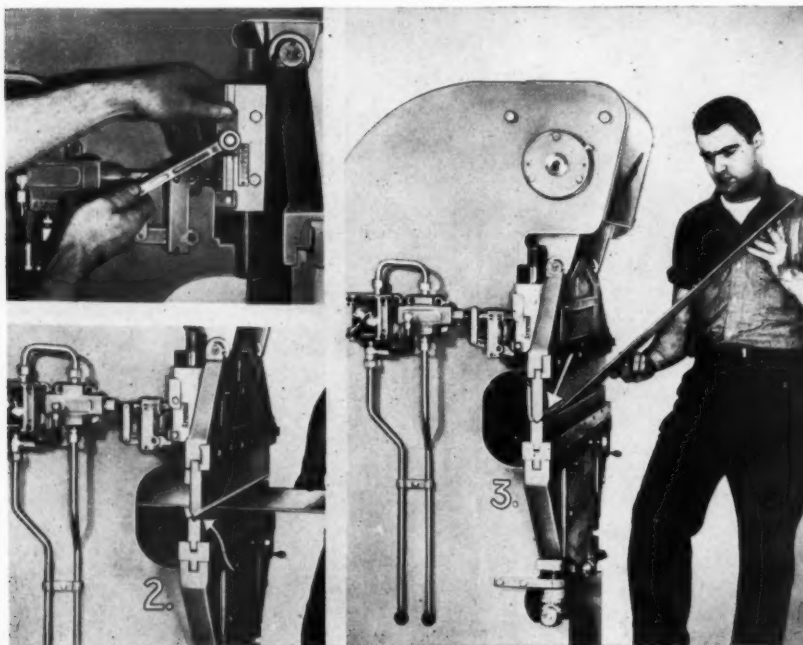


Borescope may be modified to meet specific applications.

Interesting Industry Developments

inches, and has a viewing head with a 13/16-inch diameter 100 watt lamp for illumination. For information, write Dept. MPM, Lenox Instrument Co., 2010 Chancellor St., Philadelphia 3, Pa.

1. Operator adjusts control to reduce speed of ram. 2. Before die enters material, two-way valve opens. 3. After forming, ram resumes maximum return speed.



Let-Up Control Prevents Press Brake Whip

A new accessory for all hydraulically-operated Di-Acro press brakes, called "Let-up Control," is said to eliminate whipping and resulting kinking of material during forming operations, according to the manufacturer.

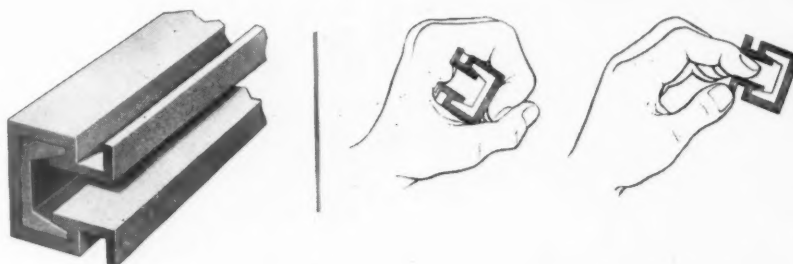
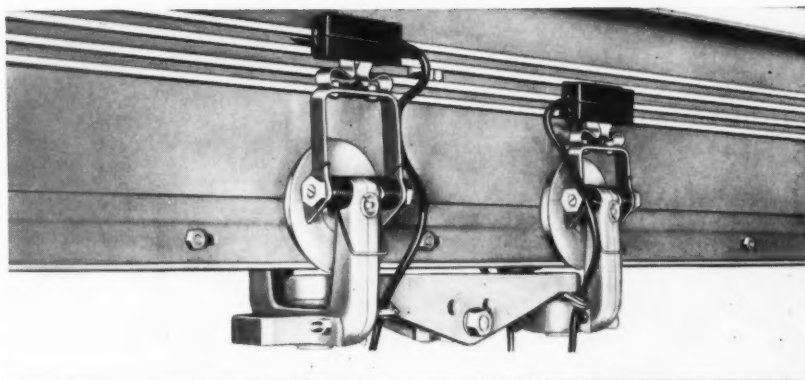
Basic element in the control is an adjustable flow-control valve. Long sheets can be handled safely and efficiently, the company states, because the speed of the ram can be reduced up to 50 per cent just prior to the time that the die in the ram makes contact with the material to be formed. While the form part of the stroke is at slow speed, the return stroke is at maximum speed.

Adjustment of the let-up control is made on a calibrated gauge which is mechanically linked to a two-way valve which opens and closes to allow hydraulic oil to flow through the flow control valve. For further information, write Dept. MPM, O'Neil-Irwin Mfg. Co., 657 Eighth Ave., Lake City, Minn.

New Shielded Electrification For Monorail Systems

BY covering a standard bus bar electrification with a specially-designed polyvinyl chloride extrusion, completely safe electrified conveyor systems can be furnished, according to a leading manufacturer of monorail conveyor systems. Under the name "Kant Shock," this shielding prevents accidental contact with live bus bars. It is said to be impossible for an adult's finger to enter the shield.

A new type sliding shoe collector provides a floating contact throughout a monorail system regardless of mis-alignment due to bent bars or at switches and interlocks. The shielded electrification is mounted in stamped bracket assemblies for live power feed throughout the system at a maximum rating of 600 volts — 100 amps. It can be applied in the field where headroom permits, to existing American MonoRail systems. For complete information, contact Dept. MPM, The American MonoRail Co., 13107 Athens Ave., Cleveland, Ohio.

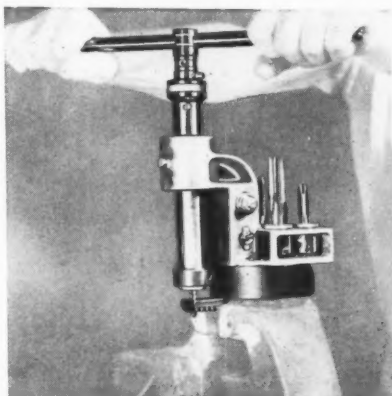


New type sliding shoe collector provides floating contact throughout a monorail system, regardless of mis-alignment due to bent bars or at switches and interlocks.

Tapper Performs Production or Maintenance Work

A MAGNETIC tapper, called Mag-Tool, is said by the manufacturer to be the first of its kind on the market. The tapper attaches to ferrous surfaces with an electro-magnetic base which develops up to 800 pounds magnetic pull. It provides the rigidity and elimination of lateral pressure which was previously the operator's responsibility, thereby preventing tap breakage and parts spoilage.

Tapper operates in any position, and performs maintenance and production work.



The unit operates on 115 AC, weighs only 10 pounds, and utilizes any assortment of manual or power 1/2" drive attachments. For further information, write Dept. MPM, Magnetic Tool Corp., 1955 Lafayette St., Santa Clara, Calif.

Magnetic Belt Conveys Loads at Angles up to 90°

A NEW magnetic belt conveyor which transports ferrous loads at angles up to 90° has been announced. In handling steel tote boxes and ferrous parts or products, either unpackaged or in paperboard containers, the conveyor's steep angle of inclination is said to save valuable floor space. The unit is claimed to eliminate the problems encountered in transferring cartons onto pusher bar boosters.

In operation, loads are carried on a thin, rough-surface belt which slides over a metal bed containing permanent Alnico magnets. The like poles of all magnets are connected with metal strips. The magnetic attraction of these continuous metal strips holds the load securely on the belt, whether being carried up or down. Write Dept MPM, The Alvey-Ferguson Co., 1750 Disney St., Cincinnati 9, Ohio.

Conveyor carries ferrous loads at angles up to 90 degrees.



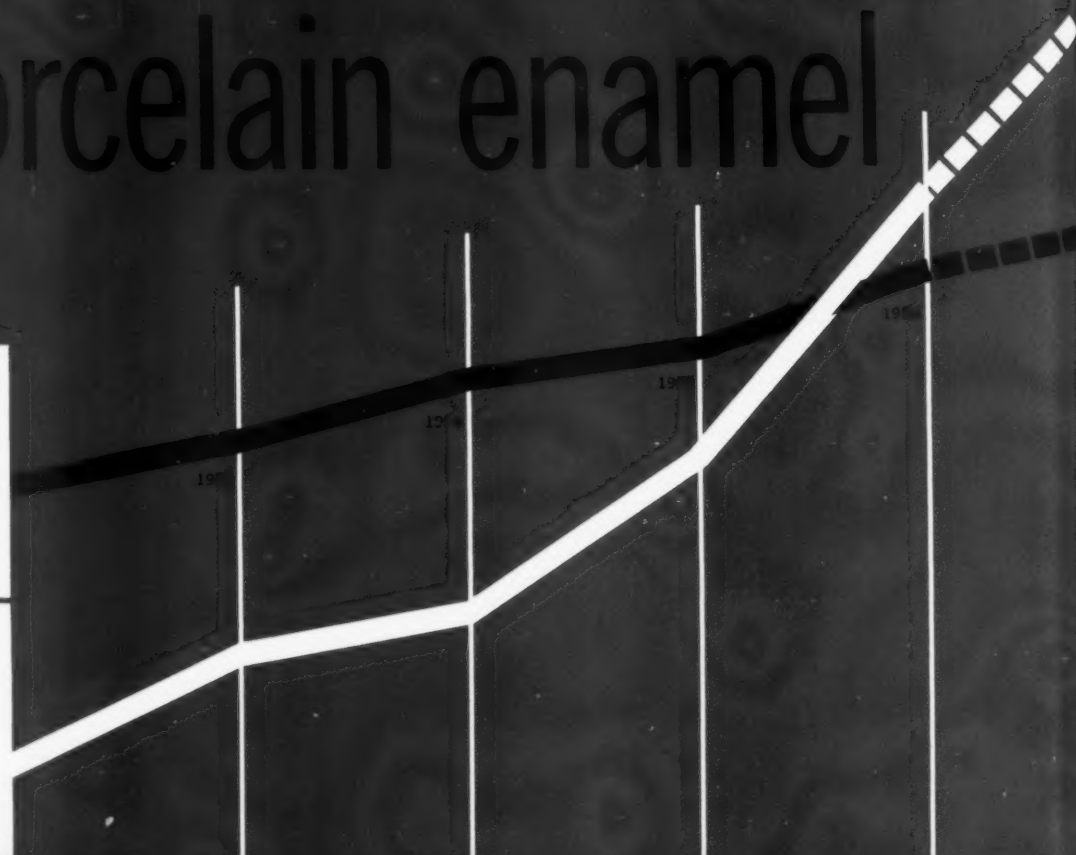
Big things *are happening in*

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NON-RESIDENTIAL
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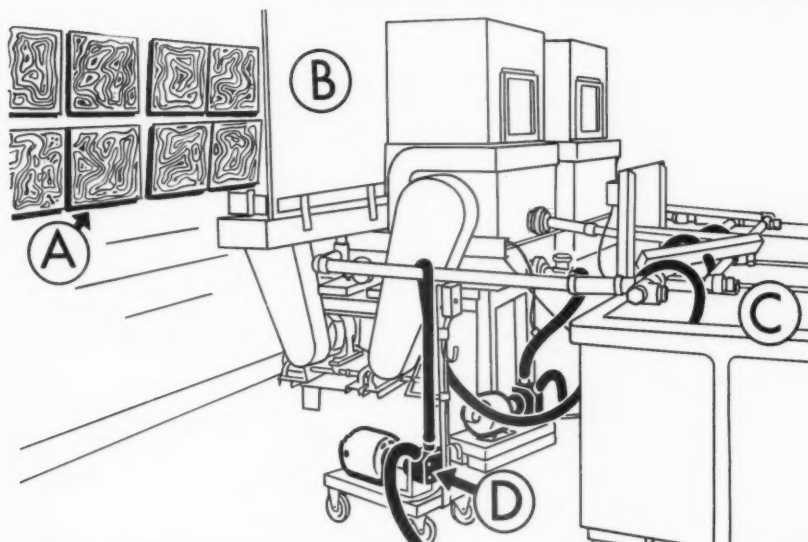
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WORLD'S ONLY COMPLETE PORCELAIN ENAMELING SERVICE . . . Including Plant Layout . . . Furnace Design and Construction . . . Product Design Assistance . . . Enamel Selection . . . Color Matching Service . . . Plant Start-Up Supervision . . . Production Trouble-Shooting . . . Cost Analysis Field Studies . . . Porcelain Enameling Materials and Supplies.

MPM

Suggestion Box

Sealless pump conveys etching fluids with no breakdown



Above diagram shows printed-circuit process. Copper foil laminated to baseboard has circuit diagram silk-screened with acid-resistant ink (A). Conveyed into etching equipment (B), excess copper foil not covered by resist ink is etched away by warm conc. FeCl_3 which is pumped from reservoirs (C) (overflow return). Third pump (D) in foreground is moveable auxiliary used for cleanout of etch-spray chambers.

ONE OF the major problems in the plating field is the continuous conveyance of corrosive metal etching solutions. Leakage of these solutions through stuffing boxes or mechanical shaft seals of conventional pumps can score pump shafts and cause costly breakdowns of pumps and flow stoppage.

The Vanton Pump & Equipment Corporation of Hillside, N. J., who manufacture plastic pumps without stuffing boxes or shaft seals of any sort, reported recently a satisfactory solution of this problem was developed for the radio and television manufacturing plant of the Westinghouse Electric Corporation in Metuchen, N. J., where the conveying of concentrated ferric chloride for printed-circuit etching had been interrupted by frequent pump breakdowns.

Basically the printed circuit process at Westinghouse consists of silk screening circuit diagrams with acid-resistant

ink on base boards which are then conveyed into spray-etch chambers. The excess copper foil not protected by the resistant ink is etched away by the warm concentrated FeCl_3 . Vapor degreaser is then applied to remove the acid-resistant ink, exposing the remaining copper circuit.

The problem had been frequent breakdowns of the three conventional pumps in use to convey FeCl_3 continuously from overflow reservoirs providing a supply of fresh liquid to the spraying system.

Now three sealless pumps with a capacity of 5 GPM each, are used. These have no stuffing box or mechanical seal and are self-priming. The fluid was in contact only with the inner surface of a plastic housing and the outer surface of a natural rubber flex-i-liner insuring complete resistance to the chemical action of FeCl_3 .

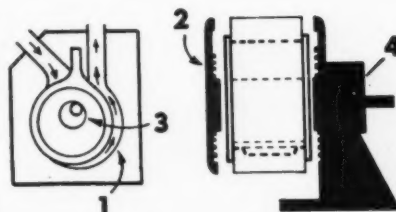
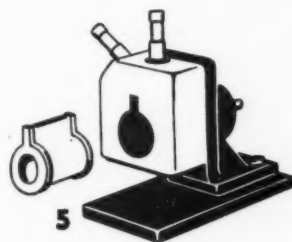
Westinghouse set a pump at each of

the two etch-chambers delivering FeCl_3 from its reservoir. A third pump was used as a movable auxiliary for cleaning out the chambers and the reservoirs, when the batch of ferric chloride was exhausted.

In addition to eliminating the problem of corrosion, maintenance was reduced to the infrequent and simple replacement of the inexpensive liner. The three pumps stayed in operation continuously for 12 hours a day.

Engineers maintain that the design of their pumps, as well as the materials of which they are made, enabled them to resolve the Westinghouse problem. The dangerous FeCl_3 flowed in a channel between the molded plastic body and the natural rubber flex-i-liner. No liquid touched metal. Flanges on the flex-i-liner straddle the pump body block and are pressed to its sides by bolted face plates, thus forming the isolated fluid channel. The pumping mechanism is a rotor mounted on an eccentric shaft which, at each revolution, pushes the flex-i-liner against the body block and sweeps a "slug" of FeCl_3 around a circular track from inlet to outlet. All bearings are life time permanently lubricated ball bearings, completely out of fluid area and further protected in a stainless steel assembly.

For additional information write to Dept. M.P.M., The Vanton Pump & Equipment Corp., Hillside, N. J. or to Special Projects Editor, Metal Products Manufacturing.



Ferric chloride flows in channel between molded plastic body and natural rubber flex-i-liner (1). Pumping mechanism is rotor on eccentric shaft (3) and flanges of liner are secured to body block by face plates (2). Bearings are outside fluid area in stainless steel assembly (4). Liners are replaced as in (5).

Superbly CHROME FINISHED!

... yet fabricated as easily as ordinary sheet metal



Yes, Specification Plate on APOLLO ChromSteel makes possible luxurious, heavy chromed finishes of unvarying quality—at the same production economies and conveniences as when working with ordinary sheet metal!

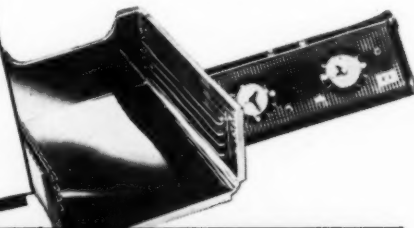
These are some of the advantages of Specification Plate on APOLLO ChromSteel:

- Can be stretched without danger of drawing out the characteristic APOLLO satin finish. Even on highly polished surfaces, deeper draws than those possible with commercial coatings can often be provided.
- Deep stretching of satin finishes can be accomplished without disrupting the grain structure or lessening resistance to corrosion.
- Cut edges are effectively armored against deterioration.
- Surface is extremely durable, resists wear and permits frequent cleaning for the life of the product or part.
- Results in a better looking product. Provides uniformity of finish that cannot be matched by any piece plating methods.
- Saves production dollars. Eliminates costly piece plating even when parts require deep draws or severe bends.

Kitchen Built-ins—doors, cook tops, control panels, burner bowls, wrapper sides and tops, kick plates, vents, hoods, rotisserie and oven linings.

Automotive—interior trim, press formed moldings, ash trays, escutcheons, rear vision mirror backs, other accessories.

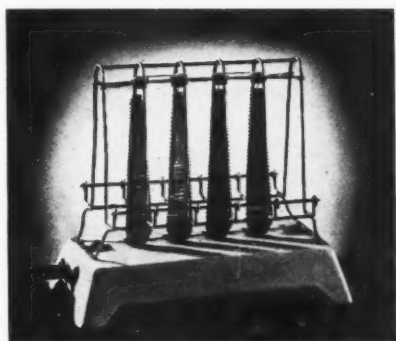
General—bathroom accessories, cabinet trim, fluorescent or recessed light brackets, dispensable paper and towel racks, soap dishes, etc.



Be sure to get the facts about Specification Plate on APOLLO ChromSteel. If you have any design or production problems, ask about APOLLO's special services. They're available without obligation. Why not contact APOLLO today?

Apollo METAL WORKS

6684 S. OAK PARK AVE.
CHICAGO 38, ILLINOIS



A MARKED CHANGE has occurred in toaster styling and mechanics since 1908. At this time, General Electric's first model (above) consisted of only the barest essentials. The new Toast-R-Oven gives today's housewife style and beauty, plus a more practical and advanced product.



The design story of GE's Toast-R-Oven

behind the development of this modern appliance were industrial designers, engineers, and manufacturing personnel working as a team

by Paul O. Rawson • DESIGNER-IN-CHARGE, PORTABLE APPLIANCES, HOUSEWARES
AND RADIO RECEIVER DIVISION, GENERAL ELECTRIC

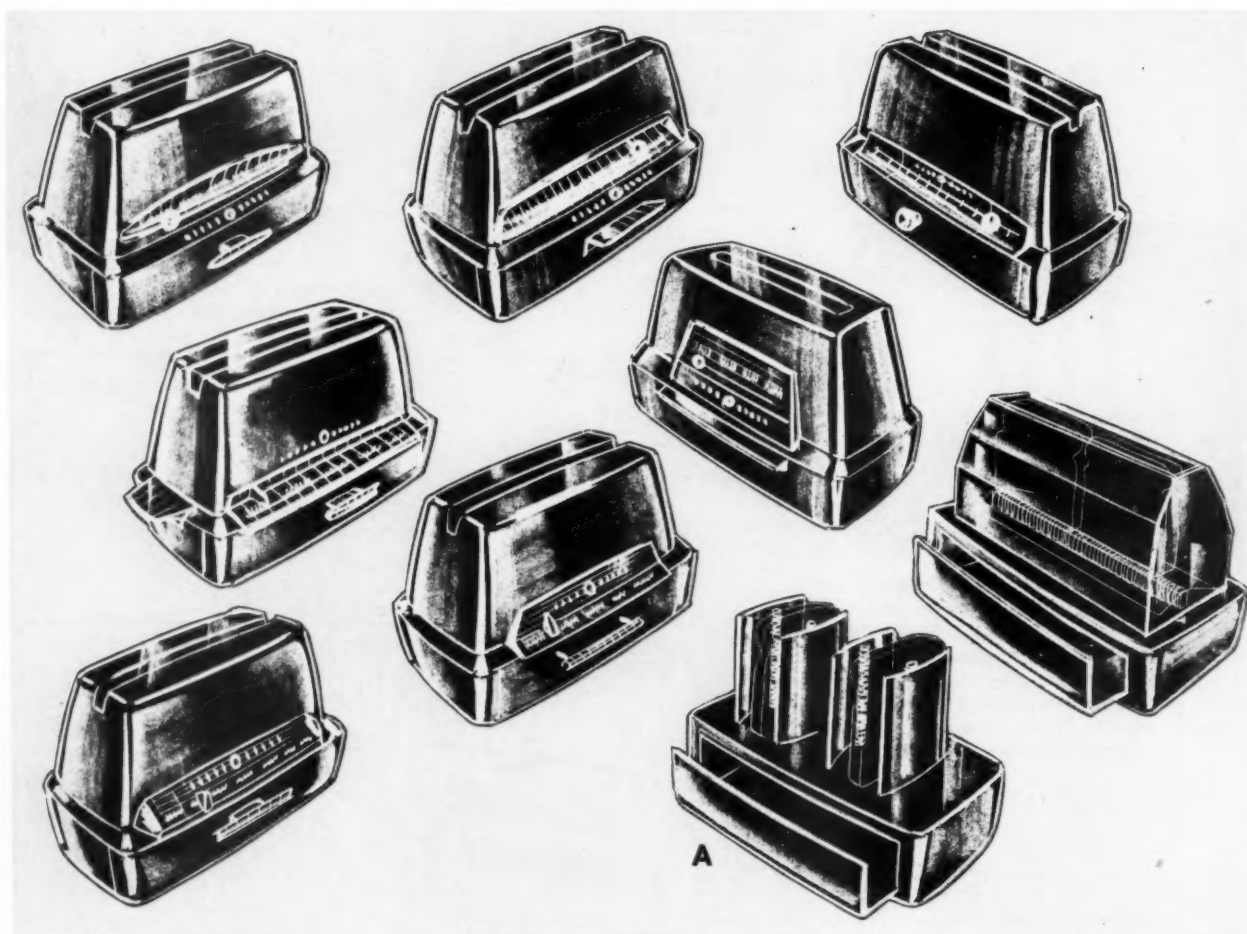
EVERY morning when your wife drops a slice of bread in the toaster and presses the lever down, she sets in motion one of the most highly-refined products on the American breakfast scene. On the market since the 1900's, a toaster operates on three out of every four breakfast tables in today's electrically-wired homes. More than 34 mil-

lion are in use—ranking second in popularity to the hand iron—and retail sales topped \$56 million during 1955, when sales reached 3,350,000.

During the past several years, toaster styling had gone stale. Yet, progress had been made since 1908 when the first General Electric model consisted of the barest essentials—simple wire-formed

bread racks and heating element supports on a ceramic base (photo, left). In those days, burn and short-circuit hazards, or an even toasting pattern, received little consideration.

In 1939, General Electric produced a pop-up toaster—an innovation making it a more nearly automatic appliance. But from the early 30's to the



SKETCHES were constantly being adjusted as the industrial designers worked along with the engineers from change to change.

present, the conventional slotted "chicklet" form prevailed. The manufacturers simply juggled the basic features common to most designs, sometimes combining them in various ways. While the mechanism had been constantly improved, costs reduced, and operational efficiency reached a high degree, still the appearance and the function remained static.

Something better

Early in 1953, management of General Electric's Portable Appliance department called together its key people to search for a new toaster concept.

Market research reports proved valuable background. Over a period of years, data had been compiled regarding the advantages and disadvantages of existing toasters. To this was added the analyses of depth interviews conducted by our advertising agency.

One problem outranked all others: frustrated hot-toast fanciers wanted some built-in provision for keeping toast warm. The objective; answer the need

for something better than the present appliance. Although no strict ground rules were spelled out, we agreed that the new product should have an open compartment, power-driven toast carriage, new appearance, and a competitive price.

As a coordinated team, industrial designers, engineers, and manufacturing personnel moved in on the project. Industrial designers felt that the appearance of the final product must express the fine engineering and the use value to the prospective purchaser. They wanted new functions and features that would allow for excitingly new physical proportions and characteristics. The proposed oven compartment—to keep toast and pastry warm, and to make open-face sandwiches—was the answer.

Fundamentals in engineering . . .

Theoretically, you might think of a toaster with a built-in oven unit as a conventional two-slotted toaster superimposed upon a horizontal heating unit located over an oven chamber. It seemed

important to depart from the conventional mica heater elements—mica sheets wound with electric resistance wire—because of their high cost and unsightly appearance.

Another engineering aim involved reducing duplication of component parts in such a scheme.

In one of the first of a great many operating "breadboard" samples designed and built by General Electric engineers, duplication was minimized. Two resistance-wire-wound rods were positioned beneath two side-by-side vertical toasting compartments; their walls reflected the rod's radiation evenly over the bread surfaces (illustration A). Although the combination of direct and reflected radiation might have offered certain advantages, full reflection was dictated in the ultimate design—and for a good reason. Over a period of time the surface of the reflectors involved in this early sample might fall off slightly in efficiency, but the direct radiated heat would not. Result, uneven browning.

At first, arrangement of component



MODELMAKERS apply plasticine to clearance skeleton while Rawson (center) watches.

parts seemed practical, but one of the working samples later created by engineering provided many more advantages, eventually deciding the final functional approach. The new arrangement placed the toasting compartments end-to-end (illustration B), reducing the four heating units of the original concept to a single longitudinal wire-wound rod. The heating elements not only toasted the bread, but also kept the contents of the oven warm — a feat accomplished by focusing the heat of the elements into the oven simply by operating a set of movable flipper reflectors.

The fabrication of the toasting compartment reflector was also simplified: the two side-by-side toasting units became a single unit that, because of its fewer joints and fastenings, contributed to greater strength and economy. The pleasing physical proportions of the length to the width and height of this engineering sample in contrast to the blocky appearance of the previous samples offered another advantage to the industrial designers.

... Designing ...

Now that the functional and economic factors were shaping up, industrial designers recognized a long-awaited break towards the good appearance aspects.

Up to this point, they had been working along with the engineers from change to change, constantly sketching and sculpturing three-dimensional clay models around the current engineering

developments. The end-to-end arrangement had such merit that a final concentrated effort began, following the usual procedures for appliances such as coffeemakers, skillets, and irons.

A task force of several industrial designers began searching — employing a multitude of pencil sketches — for a strong styling theme. The best way to make the shell components and controls from both an aesthetic and practical point of view was an important consideration. The next step; have four or five designs — composites of all the best characteristics developed — sculptured to exact size in plasticine over engineering's clearance skeleton (photo). The skeleton showed not only all stationary parts of the enclosed mechanism but also clearance for motions described by moving parts.

... and manufacturing

Using these highly-accurate three-dimensional models, manufacturing engineers gave full attention to the solution of the manufacturing problems involved in the various design parts. Forming and polishing of shells in production required certain minimum radii, generated surfaces in a vertical plane, and allowance for blanking from strip material of an available width.

Plastics components — molded of thermosetting phenolic material needed for its heat-resistant characteristics — were designed to provide sufficient gripping surfaces and protection against burned fingers. At the same time, industrial designers fashioned control knobs and push-button controls that operated easily. Full-color drawings further described the design details with respect to color and finishes, particularly in the control area.

With the fundamentals of the toaster settled, engineering advanced the development of the toaster mechanism.

Smoothing out the snags

The project had its quota of snags. The unusually-long development period indicates the many problems and limitations. In the production area alone, for many months the forming of the upper shell defied the best thinking of experts in metal forming.

The necessity of including a center baffle in the toasting compartment also caused engineering a serious setback. Needed to accommodate toasting a single slice of standard-size bread without undue browning of the bread adjacent to the vacant compartment, the addition of this center baffle meant that the toasting compartment had to be either higher

or longer to accommodate the larger standard bread slices.

Industrial Design moved in on the problem, deciding to go higher to achieve the best visual proportions and keep to a minimum the table surface required by the appliance. Engineers then developed new reflector shapes.

Directional design

The appliance's final appearance presented a stimulating challenge. Conviction was strong that the toaster, as in most similar products, should have directional design — a pronounced and recognizable front and back. Previous designs fell short because, almost without exception, the emphasis and center of interest was divided between a handle and controls on one end and a purposefully-symmetrized handle and details on the other end. New design features were needed to help our professional advertising associates better dramatize the product in their advertising and sales promotion programs.

Grouping the controls and drawer emergence (handle and temperature chart) on one of the major surfaces of the relatively rectangular mass accomplished this directional design. Though chosen for aesthetic reasons, the major surface selected happily turned out to be the placing that allowed the most satisfactory use on most dining tables and snack bars — especially when the toaster was backed up to an adjacent wall. The unsymmetrical over-all design of the shells further emphasized the front-and-back illusion. Plastics handles, once considered for placement in the conventional end-locations, were placed front and back to help heighten the effect. This placement had another benefit: it reduced the over-all dimension, an important consideration for both packaging and storing. The oven handle also doubles as a lifting handle, eliminating one of the plastics components found in many conventional arrangements.

On the market

Launched at the National Housewares Show, July, 1956, the new product has gained market acceptance; it gives the housewife what she asked for at a price only a few dollars higher than an ovenless model. And from a functional and styling viewpoint, she's getting a product that's a leader.

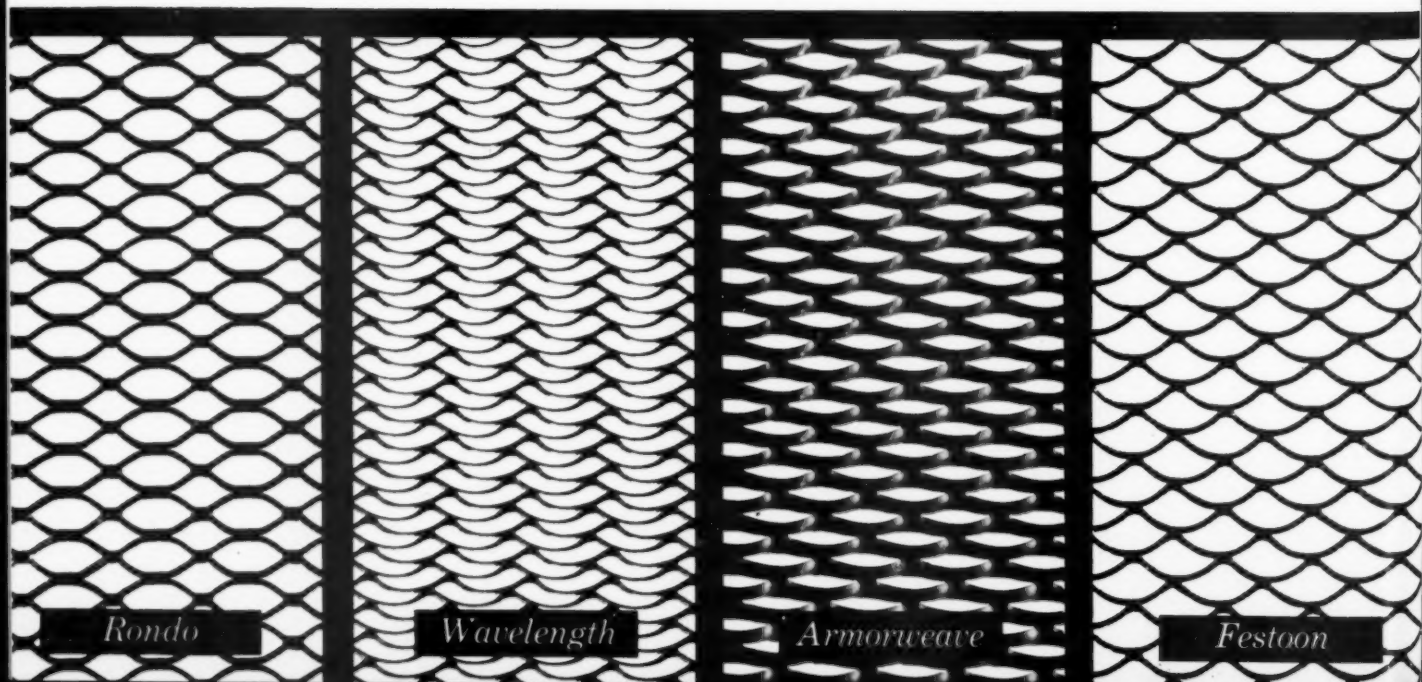
The teamwork between marketing, engineering, manufacturing, management, and industrial design has paid off once again.

to Page 32 →

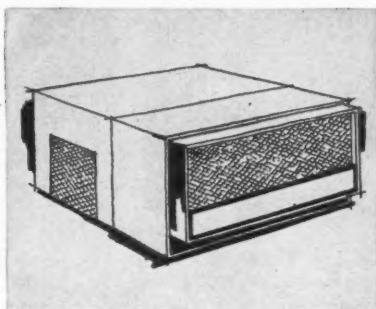
The Magnavox "Continental" is a striking example of modern simplicity, richly highlighted by a grille of ARMORWEAVE, new USG Expanded Metal.



expanded METAL



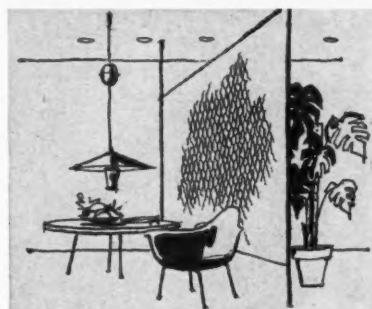
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IN PRODUCT DESIGN... these metals serve many needs. Utility racks, fruit bowls, bird cages, powder boxes, window displays, storm door guards, TV and radio grilles—but a few suggestions!



IN FURNITURE DESIGN... benefits of these new see-through metals are many. In chairs, tables, screens, cabinet doors, magazine racks, lamps, new USG Expanded Metals lend new beauty and utility.



IN INTERIOR DESIGN... architects and decorators find these versatile meshes ideal for screens, room dividers, lighting units, shelves, ornamental trims, grilles, partitions. Possibilities are endless!

sparks bright ideas, like the **Magnavox** "hi-fi look"... with light, strong, attractive new meshes

The refreshingly new Magnavox "high fidelity look" is another example of the creative freedom expanded metals offer to everyone concerned with the design, manufacture and sale of products for better living! Four new USG* Expanded Metals—RONDO, FESTOON, WAVELENGTH and ARMORWEAVE—join long-popular EXPAND-X*, to provide design possibilities unlimited. These versatile new meshes, carrying the main design theme

or serving as ornamentation, promise quick and widespread acceptance of products that utilize their beauty and charm. Cold-drawn from a solid sheet of metal—aluminum or carbon steel and, in some meshes, stainless steel—these new expanded metals are stronger than the solid sheet, yet light in weight and easy to fabricate. Whatever your product, USG Expanded Metals will help to make it *better*.



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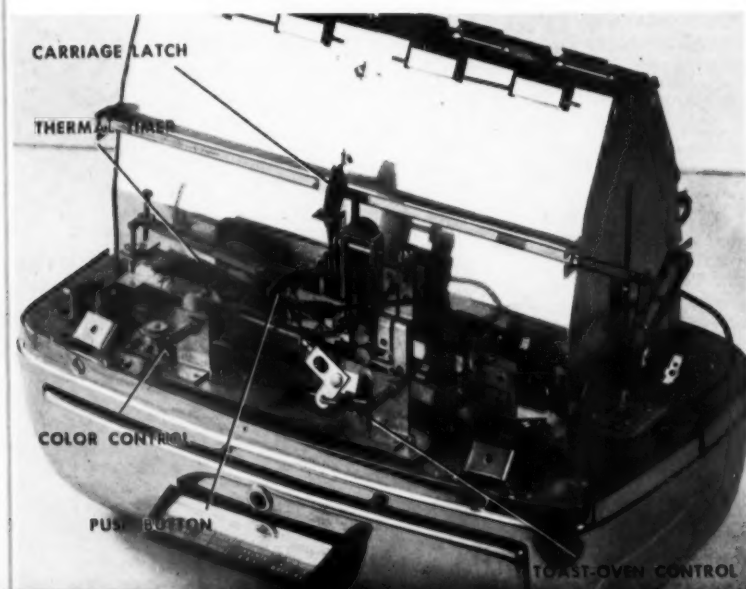
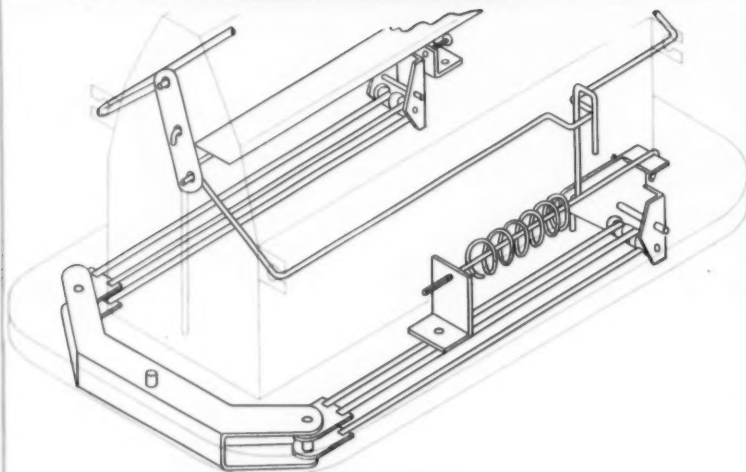
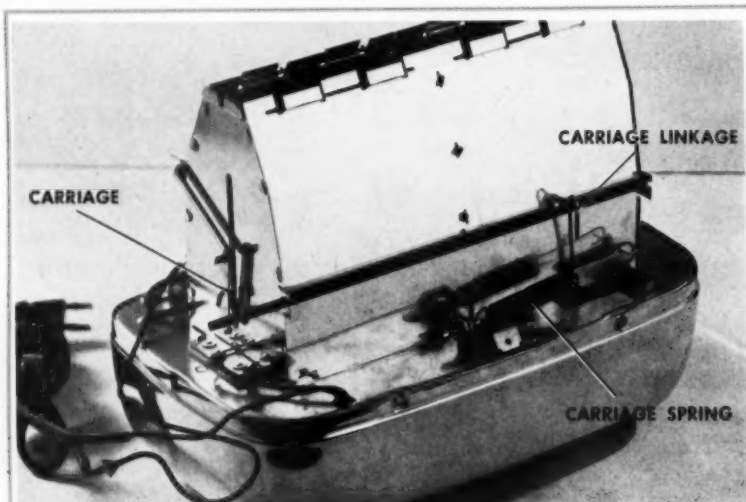
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Designing the GE toaster mechanism

Numerous power-driven carriage schemes were considered before we adopted the expansible-ribbon drive. In operation, the expansible ribbons pull against a carriage spring. Linkages are connected to the carriage spring. The ribbons expand when energized, permitting the carriage spring to

raise the carriage and the toast to the upper position. At this position, the carriage latches up and the ribbons de-energize. Cooling and contraction of the ribbons extend the carriage spring again. Releasing the carriage latch initiates the next operation. This permits the carriage to drop by gravity.



Special care taken in the design of the linkage provides variable multiplication, depending on carriage position, allowing the stress in the nickel-chrome-alloy ribbons to approximate the yield-strength curve of the material. That is, the ribbons are stressed higher in a cold condition than when heated.

After studying several ways to provide toast-color sensing elements for the toast and oven compartments, we decided to use a thermal timer similar to the one in the present toaster. The big advantages of the timer: It controlled both the toast and oven operation; and it permitted a simplified control mechanism, from the standpoint of design and for the user.

Oven warming is accomplished by the use of a unique flasher that cycles the heater on and off. The flasher consists of three small bimetallic pieces and two contacts. The heater cycles several times before reaching oven temperature. This prevents any browning or cooking of articles placed in the oven for warming. The design also provides for a slower cycling rate, eliminating objectionable radio noises.

To understand how the appliance operates, let's assume you want to make toast. Place the bread in the slot, move the right-hand control to Toast, turn the color control to the desired degree, and then push a button to start the cycle. Operating the push button drops the carriage and energizes the heater. When the toasting period is completed, the timer allows the heater contacts to open and the drive contacts to close. The drive ribbons are energized; their expansion permits the carriage spring to pull the carriage back to the upper position. When it reaches the upper position, the drive contacts open and the carriage is latched in the upper position.

To perform an oven operation, you place the item in the oven, move the control to Oven, move the color control to the desired degree, and again start the cycle by pushing the button. The oven operation is then automatically controlled in the same way as the toasting operation. To perform the oven-warming operation, merely move the color control to Oven Warm. The heater will now cycle until the push button is raised, terminating the cycle. Press down on the push button to start all operations; when lifted, the push button will interrupt all operations.

This extract was taken from a report by W. A. Schmall, Project Development Engineer:

Courtesy — General Electric Review

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with



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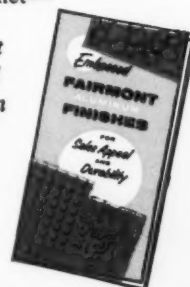
* This is one of several distinctive embossed patterns providing new eye-appeal, added rigidity and a permanent finish that constantly resists damage during fabrication in your plant, and for years to come in the hands of satisfied users. The finish is a part of the aluminum and can't wear off, crack or chip.

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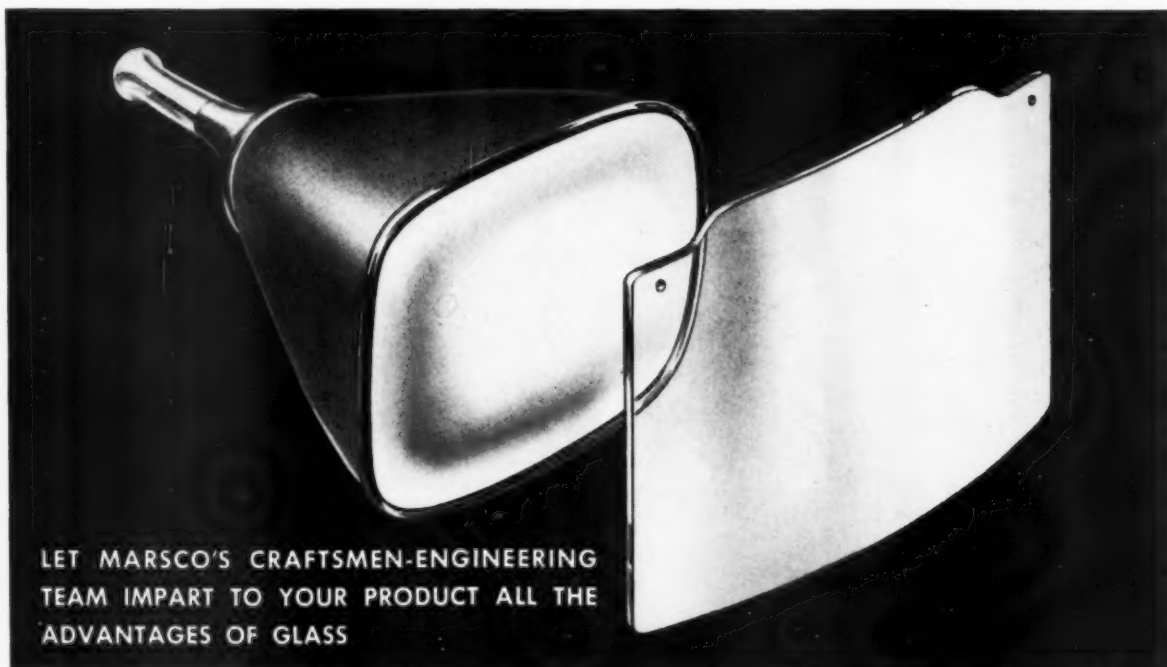
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Effect of metal characteristics on forming and welding

includes the more important aspects of specifying carbon sheet and strip,
and clarifies the limitations of the metals for fabricating operations

by *Lester F. Spencer* • METALLURGICAL ENGINEER

PART ONE: FORMING



CARBON SHEET AND STRIP is the most widely used class of materials; approximately one-fifth of the yearly steel output is within this category.

The factors which have contributed to its wide usage include: relatively low initial cost, ease of fabrication, good mechanical properties after fabrication, the ability to produce an attractive appearance on a completed article through the medium of electroplating, and the ability to coat either the flat rolled or fabricated product with a more corrosion-resistant metal as exemplified in either galvanizing, tinning, or aluminizing.

TYPES OF STEEL

Carbon steel has no minimum content for alloying elements although residual percentages of alloys may be present. The properties exhibited by this class of material are determined largely by the carbon content. In the case of enameling sheet, which can be considered as within this grouping, the percentage of metalloids, which will include manganese, silicon, sulfur and phosphorous, will have a definite influence. In the case of electrical steels, which can be considered as a specialty material, the characteristics are primarily influenced by the silicon content.

Standard consumer practice in specifying material within this category usually does not require a chemical analysis, since the material is ordered either for a specific use, or on the basis of desired fabricating properties. In this event, the steel producer will "tailor" the heat on the basis of his wide experience so that a minimum of difficulty is

realized during fabrication. However, it is essential that the fabricator has some knowledge of the various types of steel that are available and the purpose of each type.

Deoxidation Practice—On the basis of this factor, the steel will be either classified as either a killed, semi-killed, capped, or rim steel. To those who are unfamiliar with 'deoxidation,' it can be briefly stated that this phase of steel making is the control of the gas that has accumulated during melting. Thus, in the event that this gas is completely removed prior to pouring into an ingot, there will be no gas evolved during solidification and the material is termed 'killed' since it lies quietly in the mold. Increasing degrees of gas evolution while the steel is in the ingot results in semi-killed, capped, or rimmed steels.

As a general rule, rimmed steel is used for the majority of applications; this material, when properly controlled, being well suited to forming and relatively-deep drawing operations. It has the advantage of being relatively free from surface imperfections which makes it suited for polishing and electro-plated finishes. The most objectionable feature of rimmed steel is that a phenomenon such as 'aging' will occur (Finish, Oct. 1956). Thus, a material at the time of shipment may be perfectly suited for the job; however, if it is not used within a reasonable time, and aging has taken place, surface disturbances may be present in the finished part and, in extreme cases, increased breakage may result. 'Stretcher strains,' 'worms,' or 'Luder lines' are physical manifestations of the aging process; the time period required for the appearance of surface distur-

bances may be from 3 to 4 weeks; however, this phenomenon is dependent upon composition, method of producing the steel, the amount of skin rolling, the time and temperature of storage, and the original hardness of the material. The amount of forming required to produce either strain markings or breakage in material that has aged will vary from 1.5 to 10.0 percent; forming in tension will result in that the lines appear to be low spots, whereas forming in compression will result in that the lines appear to be elevations. Aging can be temporarily eliminated by roller leveling; however, upon storage for a relatively-short time, the sheet will again exhibit these surface disturbances.

Note: Materials ranging from a wide variety of iron base alloys to non-ferrous metals, as exemplified by copper, aluminum and magnesium base alloys, are utilized in the appliance and fabricated metal products field. Within the category of the iron base alloys, the materials employed may vary from a relatively pure iron, as exemplified by porcelain enameling stock, to highly alloyed materials such as the stainless steels. With respect to any material type, it should be remembered that each type has definite characteristics which will dictate a procedure during fabrication to realize the maximum potentialities of the material in question. It has been the experience of the author that a considerable amount of difficulty experienced in fabrication can be traced to an incomplete understanding of material characteristics and a resulting procedure that detracts from the maximum potential. This is the first of two articles by the author to point out how various metal characteristics affect fabrication procedures.

Table 1 Outline of Temper Descriptions

Temper	Ladle Carbon Per Cent	Rockwell Hardness	
		Minimum	Maximum
No. 1 (Hard Temper).....	0.25 Max.	B84 for thickness 0.070 inches and greater. B90 for thicknesses less than 0.070 inches.	
No. 2 (Half Hard Temper)...	0.25 Max.	B70	Approx. B85
No. 3 (Quarter Hard Temper)...	0.25 Max.	B60	Approx. B75
No. 4 (Skin Rolled Temper)...	0.15 Max.	...	Approx. B65
No. 5 (Dead Soft Temper)...	0.15 Max.	...	Approx. B65

Table 2 Recommended Rockwell Hardness Scales and Loads for Various Thicknesses of Cold Rolled Carbon Steel Strip.

Thickness, Inches	Rockwell Hardness Scale	Steel Ball Diameter, Inches	Applied Load, Kilograms
0.030 inches and thicker	B	1/16	100
0.015 to 0.030	30T	1/16	30
Less than 0.015	15T	1/16	15

In the event that aging must be eliminated regardless of the storage time prior to forming, killed steels are usually specified; this material having high uniformity and excellent ductility for those high reduction operations exemplified by deep drawing. A disadvantage of killed steels is that the surface uniformity is not as good as that exhibited by rimmed steels. However, controlled processing of killed steels, which is at a premium cost, will not only have a surface condition approaching that of rimmed steel, but also have higher uniform properties. Another method employed to produce a non-aging material that has a good surface uniformity is the use of vanadium rather than aluminum as the deoxidizing agent.

The capped steels, which are a modification of a rimming steel, is finding increasing use. This type of material has a finer grain and good surface characteristics, but is harder and less ductile than rimmed or killed steels. However, it has proven satisfactory for limited forming applications where uniform grain size is desired.

Temper Designations—During a cold rolling operation, carbon strip will work harden which will increase strength and reduce ductility. This is a desirable property in the event that the fabricated part, which is subjected to limited deformation as in brake or roll forming techniques, requires maximum strength or stiffness. Thus cold rolling, which is

a controlled process, can give useful combinations of hardness, strength, stiffness, and ductility; the net result being the production of various tempers. It should be remembered that as the temper increases, formability decreases, and the question as to what temper should be specified for an application will be based primarily on both the operation to be performed and the permissible bend. Since the Rockwell hardness is used as the criteria in determining temper, the temper designations as related to both carbon content and hardness is given in Table 1. Typical illustrations of the forming characteristic of each temper is given in Fig 1. A brief description of each temper is as follows:

No. 1 (Hard Temper)—This temper is very stiff and springy cold rolled strip intended for flat work. It cannot withstand cold forming operations.

No. 2 (Half-Hard Temper)—This temper is moderately stiff intended for limited bending. It can be bent 90 degrees across the direction of rolling around a radius equal to the thickness of the plate ($R = t$).

No. 3 (Quarter-Hard Temper)—This temper is medium-soft intended for limited forming, bending, and drawing. It can be bent 180 degrees across the direction of rolling over one thickness of the strip, and 90 degrees in the direction of rolling around a radius equal to thickness of the strip.

No. 4 (Skin-Rolled Temper)—This temper is a soft, ductile cold rolled strip intended for fairly-deep drawing where surface disturbances are objectionable. It can be bent flat upon itself in any direction. Skin rolled, planish rolled, and pinch passed are equivalent terms in respect to this temper.

No. 5 (Dead-Soft Temper)—This temper is soft and ductile which is produced without definite control of stretcher strain markings or fluting. It is intended for difficult drawing applications where surface disturbances are not objectionable. It is also suitable for bending flat upon itself in any direction.

Finish Designations—This factor is of importance since it is directly related to the proposed surface finish given the completed part. For the majority of end uses, the specified finish is given to one side; however, where it is required for both sides, the steel producer should be informed. The finish designations available for cold rolled strip are:

No. 1 (Dull Finish)—This strip is without a luster and is especially suited for paint or lacquer adhesion. This finish is also beneficial in deep drawing application by permitting lubricant retention and thus reduce contact friction between the die components and the strip.

No. 2 (Regular Bright Finish)—This finish is preferred on parts that are to be buffed and polished to a high lustrous finish. It is not suitable for applications that are to be electroplated. It should be remembered that this finish must be protected during fabrication.

No. 3 (Best Bright Finish)—This finish is designated where the end product requires an electroplated surface. It is essential that the high lustrous finish obtained in this strip must be protected during fabrication; the premium cost for this finish makes

Table 3 Relation of Rockwell Hardness to the Average Grain Size. (4)

Rockwell "B" Hardness	Average Grain Size per Square Inch
54	384
51	288
48	192
45	144
42	96
39	72
36	48

this precaution an economic necessity.

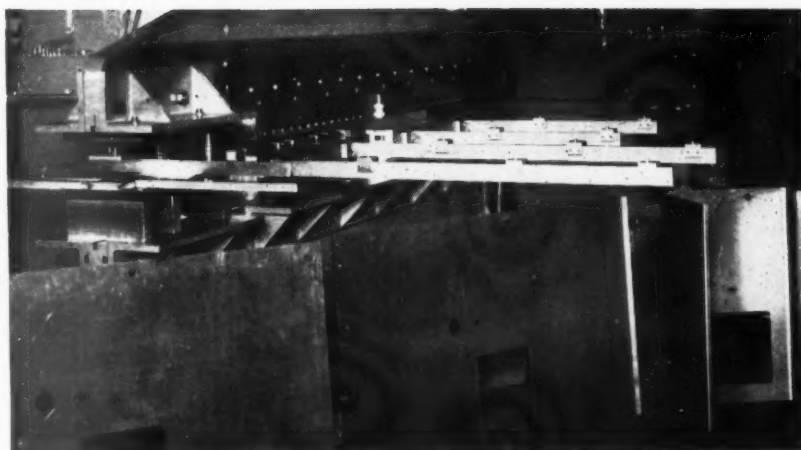
In reference to carbon sheets, the most frequently designated type is one that is cold rolled to obtain a surface finish that is superior to hot rolled, pickled sheet. Although grading of cold rolled sheet is on the basis of standard quality and cold rolled primes, which is on the basis of surface imperfections, this material is specified as to quality:

Commercial Quality which is suitable for exposed parts requiring a good surface finish. It is produced with a dull surface texture intended for applications of various organic finishes such as paints, enamels, or lacquers. They are *not* suitable for electroplating, especially where surface uniformity is essential. When specified, this quality can be produced so as to be free from fluting or stretcher strains; the degree of immunity depending upon the previously mentioned deoxidation process and roller leveling.

Drawing Quality is suitable for fabrication into more difficult parts that require a good surface finish. It also is produced in a dull surface texture for reasons mentioned previously for CQ quality and, in addition, it is *not* suitable for electroplating.

Physical Quality is specified when mechanical properties are more exacting than that obtained with either CQ or DQ sheets.

Carbon sheet, identified as enameling stock, are subjected to high temperatures in the process of applying a porcelain enamel coating. The tendency to sag or warp during this



Forming water cooler cabinets on the press brake; punching and forming involved to produce this item.

processing is minimized by closely controlling both the composition and the processing. Although the composition is left to the discretion of the steel producer, a typical chemistry would contain 0.03 percent carbon, 0.05 percent manganese, 0.010 percent phosphorous and 0.025 percent sulfur. As with other sheets that have higher carbon, this material is available both as commercial and drawing quality with the characteristics similar to that mentioned above.

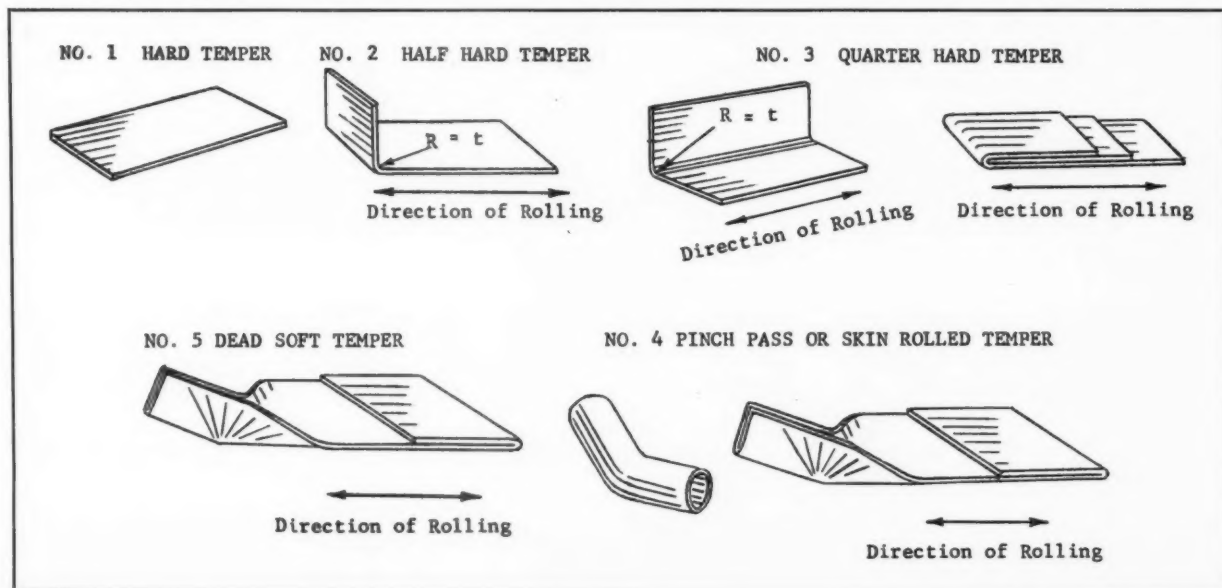
Forming of the carbon steels

The above information is essential in choosing a material that will give a minimum of difficulty in a specific forming operation. As an example in the use of this information, brake forming,

draw-bench and roll forming, where bending is the prime method of deformation, tempers No. 1 to 3 can be chosen where the strength of the part is the prime factor; the specific temper being dependent upon the extent of forming. Where the formed part will be painted, Finish No. 1 is specified, whereas, electroplated finishes require Finish No. 3. If the part is to be severely worked, as in deep drawing, temper No. 4 is specified for rimmed steel where surface markings are of importance, whereas, in an internal part where surface markings are not important, the No. 5 temper may be satisfactory. In either case, Finish No. 1 is chosen for better retention of lubricant. When

to Page 64 →

Fig. 1. Types of formation for which the various temper numbers of cold rolled carbon steel strip are suited. (1)



REPUBLIC STEEL SHEETS PROVIDE CUSTOM PROTECTION



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Republic Continuous Galvanized, used for the liner box, is subject to shearing, blanking, piercing, forming, flanging, soldering, beading, and Pittsburgh Lock Seaming. In spite of this punishment, its tight zinc coating remains undamaged. Ductility assures easy workability, yet the steel is rigid enough to withstand severe use.

Republic Electro Paintlok®, used for the exterior housing, provides an excellent paint-adhering surface

even after stamping and forming. "Hot room" tests have proved it the best base material under temperature and humidity variations found in any part of the world at any time of year.

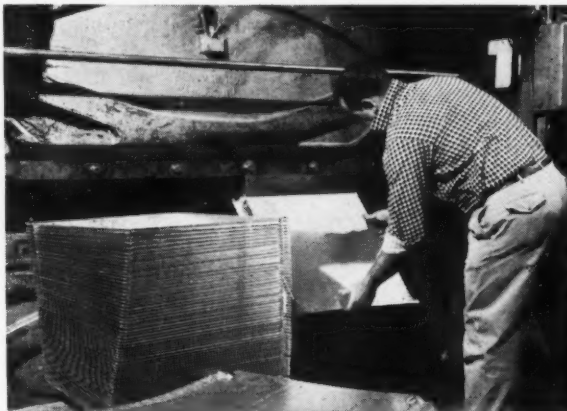
Republic ENDURO® Stainless Steel, used for hinged covers on lift-top dispensers, provides a handsome appearance and is easily kept clean and sanitary for the life of the cooler.

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REPUBLIC ELECTRO PAINTLOK retains its excellent paint-gripping surface characteristics after severe forming operations. Produced by electro-galvanizing and a chemical treatment process, Electro Paintlok Sheets are shipped from the mill in prime condition for painting. Even if final finish is scratched through, this coating limits corrosion to the point of damage.



REPUBLIC CONTINUOUS GALVANIZED steel sheet is subject to extreme forming processes during fabrication into the cooler liner box. Its tight, uniform zinc coating will not crack, flake, or peel under any operation permitted by the base metal. Excellent ductility allows easy workability, yet sheet is sufficiently rigid to withstand rugged service.

REPUBLIC ENDURO STAINLESS STEEL provides bright, long-lasting beauty with minimum maintenance. Forming and working qualities of ENDURO permit fabrication on existing equipment. Exceptional strength and toughness plus high heat- and abrasion-resistance keep products looking newer longer. Send coupon for information on Republic ENDURO Stainless Steel and other sheet products.

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MCDANEL laboratory mill jars accurately duplicate ball mill grinding action

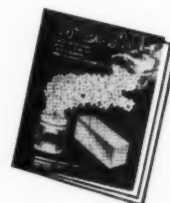
Easy to handle, discharge and clean. Fully glazed outside; unglazed inside. PRJ-IG has recessed hardware for smoother roller mill operation.

Close-fitting covers prevent leakage; can be tightened by hand. Equipped with Neoprene or rubber gaskets. (Neoprene recommended for oil base grinding.) Quart, gallon and two-gallon sizes. Full charge included.



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Porcelain enameling at Frigidaire of Canada

by Fred D. Johnson

RECENT years have been a period of high volume appliance sales in Canada. Turnover has been maintained by frantic retail selling and severe price competition.

In the face of ever-narrowing profits, Frigidaire of Canada invested heavily in facilities which would ensure leadership in the field. Its modern plant in Toronto was completed in 1952. The porcelain enameling department has the reputation of being the most modern in Canada. It cost over \$2,500,000 to install. Deliberately designed for future needs, the plant is able to spread its work out to provide minimum work stoppage during slack periods.

Production consists of household re-

frigerators, kitchen ranges, washing machines, home clothes driers, and dehumidifiers. While production rates are not made public, total productive output is reported to be in excess of 150,000 units per year. Operation reports show the percentage of porcelain rejects to be less than 3 per cent of production, and practically all of such rejects are reoperated and reclaimed. There are fifteen quality check points which must be passed in the enameling process. Dirt control is achieved by nightly vacuum cleaning.

Movement of parts is fully conveyorized. Average conveyor speed is 15 to 18 feet per minute. Size of the system can be judged by the fact that parts are

in movement on the conveyor for three hours after leaving the enameling furnace.

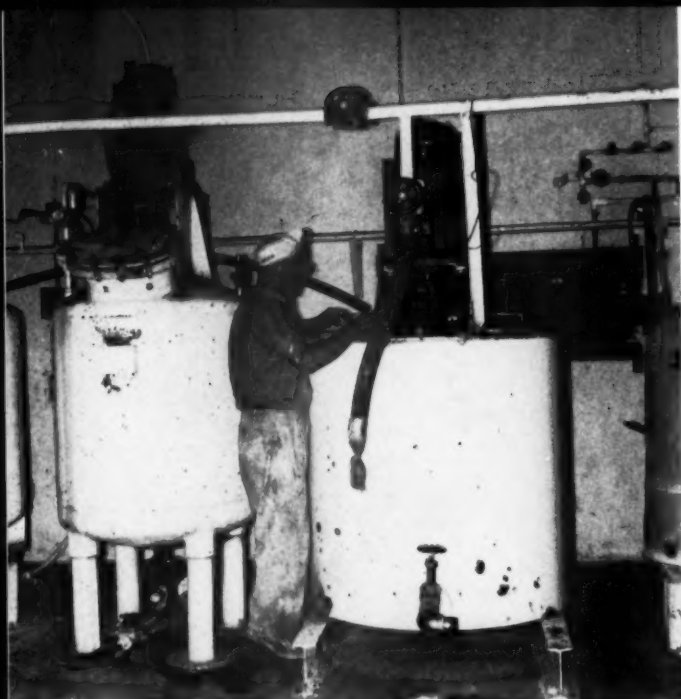
Frit milling

Six thousand square feet of basement floor space is taken up by milling equipment. The porcelain-lined mills are loaded from the floor above, at ground level, through telescoping stainless steel chutes.

The mills are loaded with porcelain balls whose diameters are carefully graded as to ratio of sizes. The size of charge is correctly established by previous experiment to get the fastest milling time. As a result, ground coat batches are fully ground in 2½ hours

Water cooled ball mills in basement mill room are served by stainless steel chutes from ground floor storage.





Agitated storage tanks, like the one here being inspected, hold coating until it is transferred to pressure supply tanks.

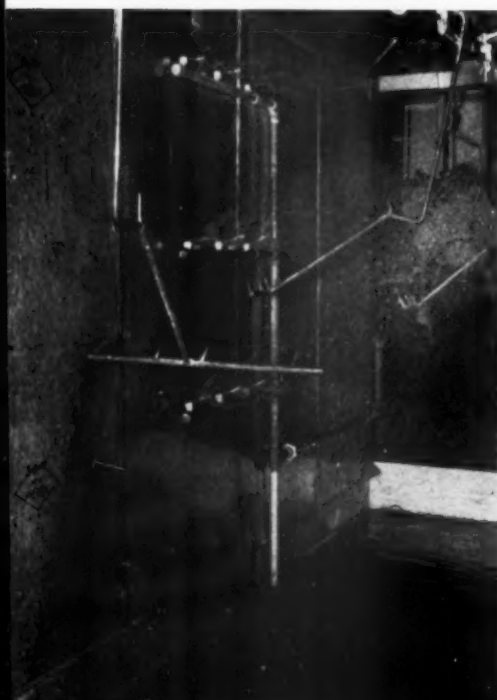


Metal parts are prepared for coating by passing through pickling tunnel.

and top coats in 4 hours. Completion of grinding is indicated when from 0.5 to 1.5 per cent is retained on a 200-mesh screen.

In addition to frit, ball mill charges consist of clay, bentonite, natural gums, potassium chloride, sodium nitrite, and hiding power pigments. Milling equipment consists of 3 2000-lb. charge units, 3 1000-lb., 1 400-lb., 2 100-lb. and a 25-lb. experimental mill. Production mills are water cooled, and the milling area is semi-air conditioned to keep at-

Hangers are washed clean of adhering unfired enamel in this washing tunnel.



mospheric temperature as close as possible to 70°F.

After milling, charges are transferred to storage tanks by a pump which propels the abrasive liquid by means of a rubber stator and a spiral drive. After a suitable aging period, the liquid is pumped to pressurized delivery tanks. During the transfer, it passes a magnetic screen to remove any metallic impurities present. In the delivery tanks viscosity and specific gravity are adjusted to that needed for the application method used. The finished coating is then pumped by air pressure to the various end-use points on the floor above. About 40 psi is used to fill the dipping tanks. Forty to forty-five pounds supply ground coat spray guns. Cover coat guns are supplied by 50 to 60 psi.

Metal pickling

Pickling is done both by dipping and conveyorized spray machine. The following are typical dip-type pickling operations:

1. Cleaner solution consisting of sodium orthosilicate compound in water maintained near boiling temperature.
2. Hot rinse in continuous overflow tank.
3. Second cleaner dip same as operation #1.
4. Hot rinse same as operation #2.
5. Hot rinse same as operation #2.
6. Sulphuric acid dip maintained at 170°F, in lead-lined tank.
7. Hot rinse same as operation #2.

8. Nickel sulphate dip maintained at 170°F. This solution is filtered continuously, and back-washed to remove precipitates once weekly.

9. Potassium cyanide neutralizer dip maintained at 150°F. This solution is continuously filtered and back-washed in the same way as the nickel sulphate solution.

10. Hot water rinse same as operation #2.

11. Hot water rinse, continuous overflow, maintained at 210°F to heat metal up to the point that all water will evaporate as it leaves the dipping tank.

All tanks are heated with live steam using both coils and steam ejectors. Solutions are titrated twice daily to maintain constant chemical concentration.

The lay-down type spray machine consists of a tunnel through which a conveyor carries the parts. Its use is dictated by the design of the work being processed, and it is particularly useful for handling parts which might float. The conveyor belt consists of several strips of neoprene, running parallel. Spray penetrates from beneath through the slots between the neoprene strips. It is also directed downward.

The cleaner spray consists of a solution of sodium orthosilicate compound, at 200°F. This is followed by two spray rinse zones, one at 180°F, and one cold. The sulphuric acid spray is heated to 170°F. The water rinse following the acid spray can contain no



Pans are shown being cover coat dipped in these tanks.



After cover coat has been oven dried, it is reinforced, touched up, and brushed in this reinforcing booth.

more than 1 ounce per gallon of sulphuric acid carry-over, to make the work suitable for the nickel spray. The nickel spray is kept at 180°F and at a concentration of 0.25 to 0.75 ounces of nickel sulphate per gallon. It comes from two storage tanks. One is in use while the other is prepared ready for use when the first is discarded. A sodium cyanide neutralizer spray following the nickel treatment is maintained at 140°F. This is followed by a cold spray, then by a hot spray held at 200°F to allow the metal to pick up enough heat to dry off after it leaves the pickling tunnel. As with the dipping operation, concentrations of solutions are kept constant by regular titra-

Metal around assembly holes must be cleaned of enamel, for electrical grounding, with this rotating brush.



tion. Since the whole object is not immersed, the actual volume of liquid in use is much smaller.

After parts have been pickled, they are coated as quickly as possible. Exposure to the atmosphere causes degradation of the metal surfaces for vitreous enameling. Workers handling pickled pieces must wear gloves at all times, and the metal must be protected mainly from acid fumes, moisture or steam.

Hangers for the various parts are carefully designed so that they are held in the right position for spraying or dipping. In the latter case, it is very important that the surplus should drain to one point where excess can be removed easily. It should be noted too that the hangers are washed before each re-use in an automatic spray washing tunnel. This prevents build-up of coating on suspension points and subsequent marring of the work.

Ground coat application

Ground coat is mostly applied by dipping, though about 10 per cent is sprayed. Spraying prevents floating color, and gives a better appearance to pieces which are ground coated only.

The cobalt ground coat is applied to give a fused thickness of 3.5 mils. After this coat is applied, the parts are conveyed through the dry-off ovens. The ovens are of double-deck construction with some of the work going through the bottom tunnel and the balance going through the top one. There are two

such ovens making a total of four lines capable of being continuously dried. Exposure used in the ovens is 10 minutes at 250 to 300°F.

Since the cases of household electrical equipment are grounded, there must be good electrical connection between the various joined parts. It is necessary, therefore, to leave bare metal around certain holes through which joining bolts are inserted. This is done by means of a rotary brush with a metal

to Page 77 →

Ground coat is dipped on panels. Ninety per cent of ground coat ware is dipped.





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stampings and fabricated parts,

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Youngstown produces drawn stampings and fabricated parts for leading manufacturers of various products—providing quality parts and a dependable, economical source of supply.

First we analyze the part to be produced, design and build the required special tools, arrange the production line to produce parts efficiently that meet your exact specifications. That is why Youngstown Metal Products has been a preferred source of supply to many manufacturers for the past 25 years.

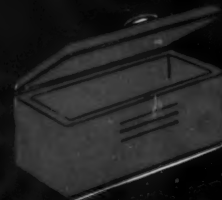
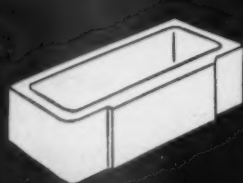
If you require quality stampings or fabricated parts—medium or large—call or write Youngstown today to discuss your requirements.



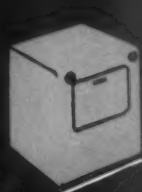
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METAL PRODUCTS COMPANY

Youngstown 1, Ohio



THERE'S NO COLOR SYSTEM LIKE TINT-TANIUMS

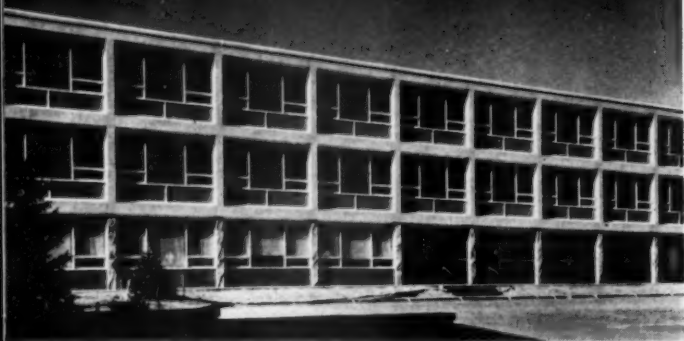


Tint-Taniums have firmly established themselves in regular daily production in some of the nation's most respected appliance manufacturing plants. These colored frits, made exclusively by Chicago Vit, provide a number of distinct production advantages foremost among them being unequalled color stability. They are handled as easily as white titanium frits, and completely eliminate the chance for human error that exists in systems where colors are added at the mill.

Tint-Taniums also bring you economic advantages, and give your finished products fresh new sales appeal. So, if you plan to use colors in your new products, you'll find it profitable to choose Tint-Taniums. There's nothing else like them!

Chicago Vitreous CORPORATION

1425 South 55th Court • Cicero 50, Illinois



INSULATED PORCELAIN ENAMEL panels, by Ingram-Richardson Mfg. Co., Beaver Falls, Pa., played a part in making possible the construction of St. Pius X School in Omaha, Nebr., at cost savings ranging from 27 to 32-per cent less than other schools built recently in the area. Prefabricated panels are of two types, some consisting of a 16-gauge steel porcelain enameled face with a 1" Fiberglas core, and others of the veneer type attached by clips.



COMPTOGRAPH 220 M, Comptometer Corporation's new adding machine, simplifies multiplication by printing only the two factors and the correct answer on two lines, instead of seven lines for conventional 10-key adding machines.

OFF THE FLOOR cabinets, by St. Charles Mfg. Co., bring feeling of lightness to the kitchen. Featuring island and peninsula arrangements that "float," the combinations of steel and wood fronts may be used also for contrasts in texture. Several colors may be combined to form bold patterns, and the units are available in sixteen different decorator colors on steel, and in various birch finishes for flush wood doors on cabinets of steel.

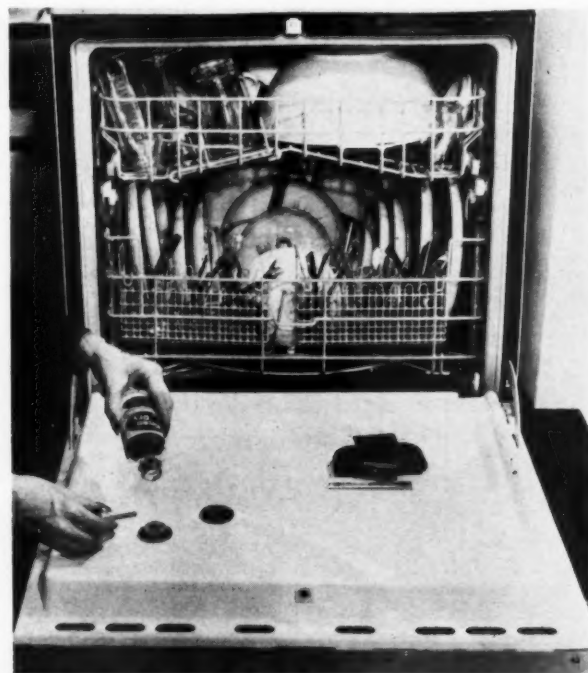


the MPM

on the theory that one photo equals one thou
ture will bring you many photos and few



INTERNATIONAL 6-cu. ft. refrigerator, by Lec Refrigeration Lt., Bognor Regis, Sussex, England, features modern styling, sleek contours, and gay color combinations. Full width all aluminum freezer locker, with snap spring plastic door, is said to offer good frozen storage. Nylon-hinge bearings give easy door movement.



SPOT-FREE DRYING of dishes is said by Waste King Corp. to be assured by a Rinse-Dry injector system in their line of automatic dishwashers. A detergent wetting agent is injected into the final rinse water automatically, breaking the surface tension of the water so that it sheets off glassware, china, and silverware without leaving spot-producing drying patterns.

... foto-news

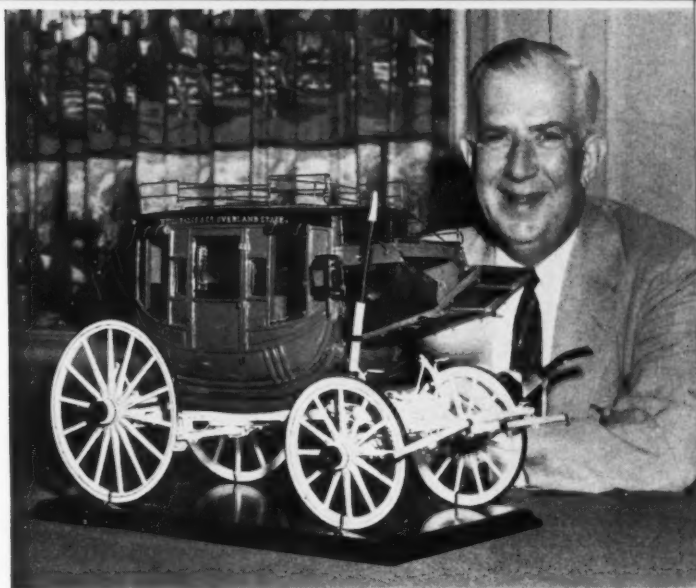
one thousand words this MPM foto-news fea-
nd few words about people and products.



OASIS "In-A-Wall" water cooler, by Ebco Mfg. Co., is designed to provide custom-tailored water cooling with functional appeal. A grill covers the unit when installed in or behind a wall, and is available either in stainless steel, or with a prime coat ready for painting. The unit comes in 5- and 10-gallon per hour capacities.



EDSEL CITATION features use of more than 50 pounds of aluminum, from nameplates to drive assembly, according to Aluminum Co. of America. The light weight metal replaces more than twice its weight in ferrous metals. Seat fabrics are woven with aluminum yarns.



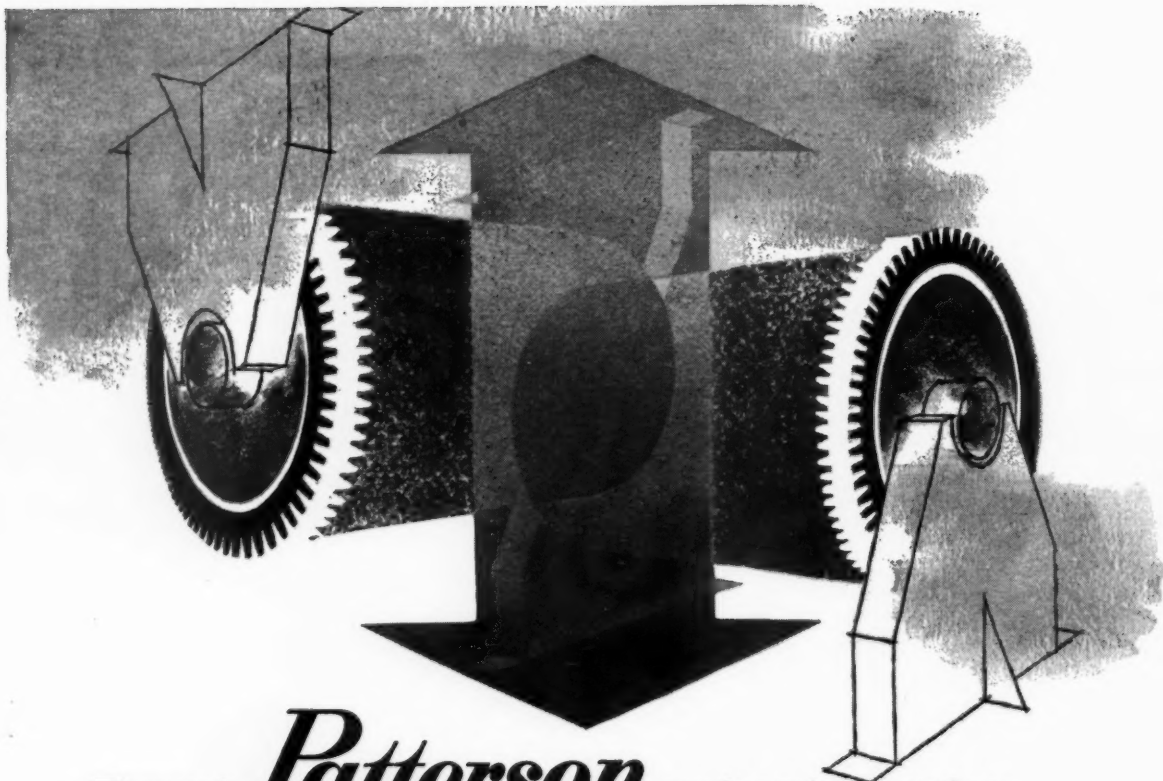
STAGECOACH recently completed in spare time by W. Russell Greer, who retired in mid-summer as vice president of Pemco Corp., Baltimore, Md., after thirty-six years of service. He will continue as a member of Pemco's board of directors. Greer is a past president of the Sales Executive Council of Baltimore, and a member of the National Sales Executives.

SMALLER than the average portable television set is the new 59-pound Mitchell True Portable room air conditioner introduced to its distributors by Mitchell Mfg. Co. Special snap-in panels permit quick installation in regulation and casement windows without special permanent equipment. Dimensions are 16" in width; 15" in depth; and 12" in height.

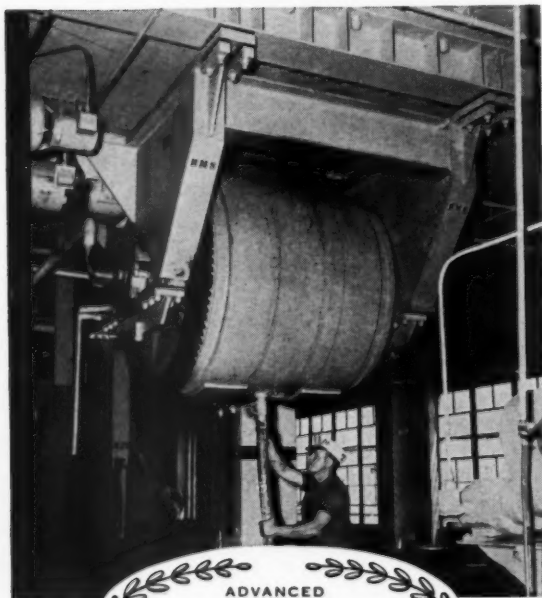


GIANT REPLICA of key to a 1957 Mercury station wagon is accepted by Rusty Lantz (left), retail salesman for the John A. Brown Co., Oklahoma City appliance dealer, as his prize for knowing all the answers in a product information quiz on RCA-Whirlpool air conditioners. Joe Ogden, general manager, air conditioning, Whirlpool Corp., made the presentation.





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Wherever ball and pebble mills grind, new efficiencies can be developed by skilled operations analysis! For the paint industry, Patterson engineering service is available for complete millroom modernization surveys, including equipment relocation, materials handling improvements and all related factors—based on the experience of the Patterson organization in solving industry's grinding problems for more than 90 years. Let us arrange to have a Patterson engineer sit down with you for a preliminary discussion at your convenience, without obligation. Write us.

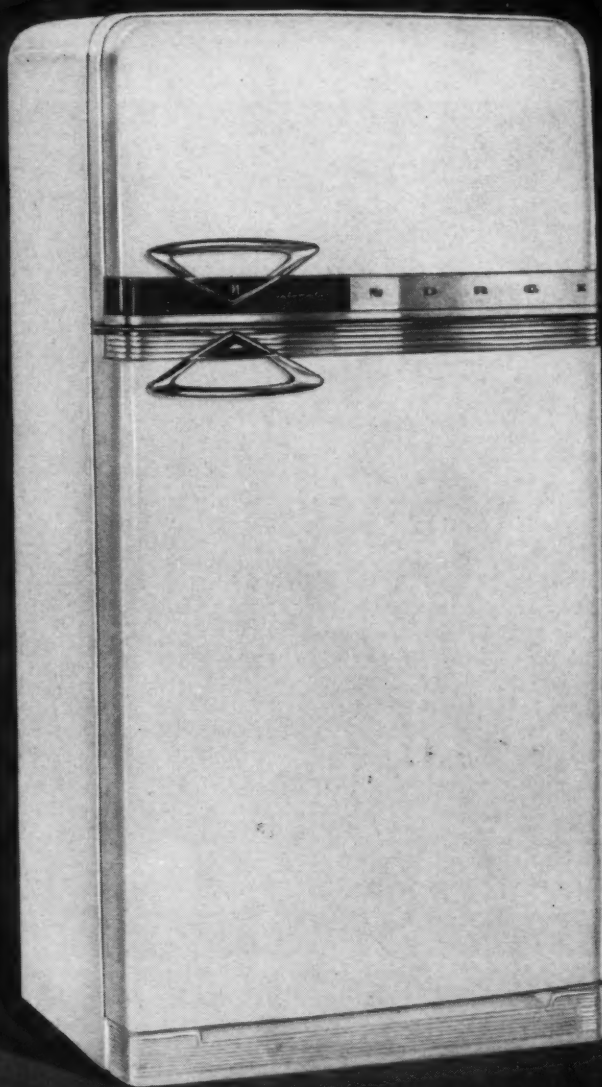
THE ***Patterson*** FOUNDRY AND MACHINE COMPANY

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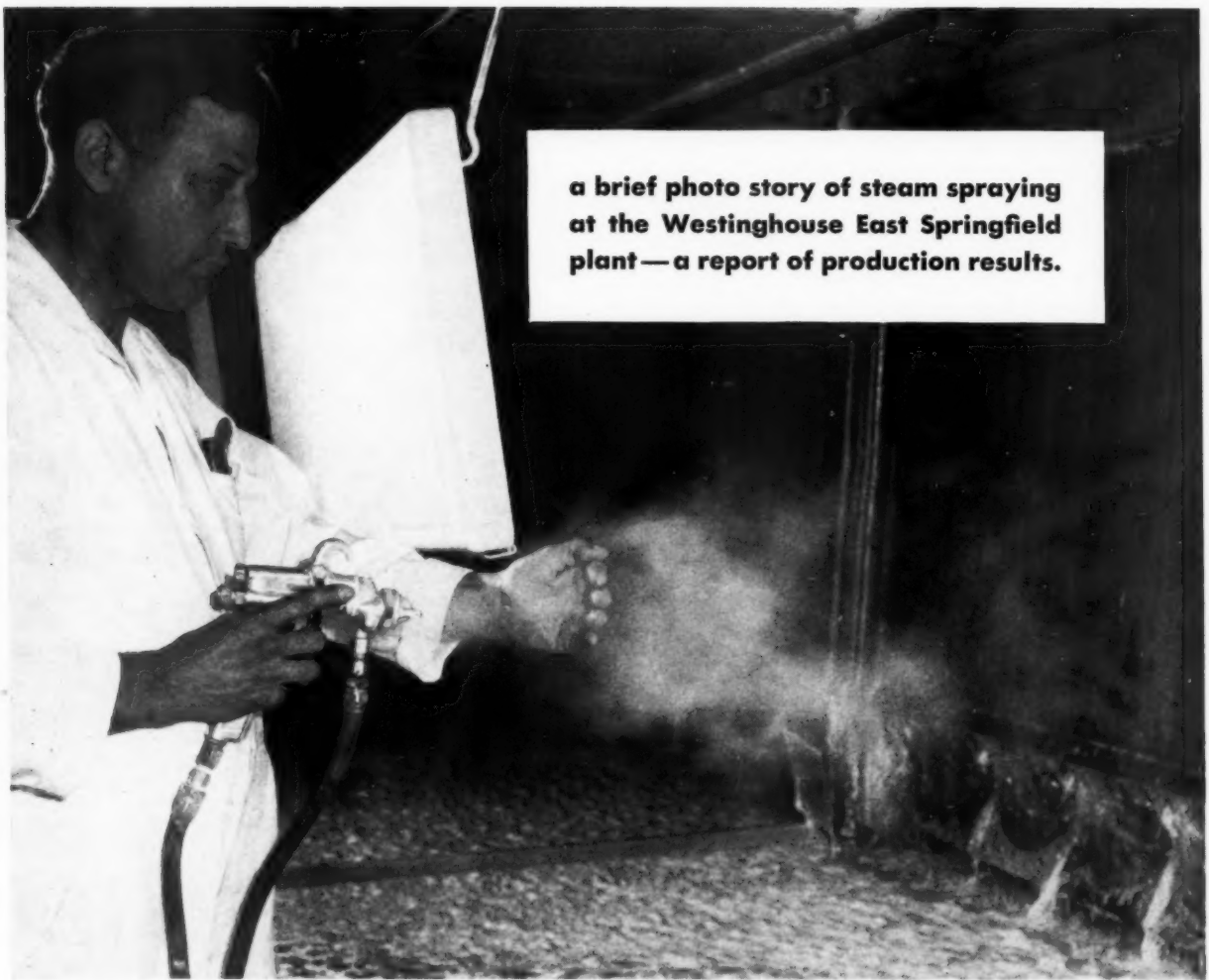
Over 61,000,000 major home-appliance units
have been finished with Du Pont DULUX Enamel.

LEADING APPLIANCE MANUFACTURERS know that durable Du Pont DULUX is a finish of consistent quality. Every shipment of this fine finish meets the same rigid specifications. And that's just one of the important cost-cutting, sales-winning advantages that DULUX offers.

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DULUX keeps its flawless appearance after years of constant use in the home. Its easy cleanability, resistance to wear and long-lasting whiteness help build the continued customer satisfaction so vital to the success of any appliance line. No wonder so many of today's topflight appliance manufacturers use Du Pont DULUX Finishes.

E. I. du Pont de Nemours & Co. (Inc.), Finishes Div., Wilmington 98, Del.



**a brief photo story of steam spraying
at the Westinghouse East Springfield
plant—a report of production results.**

The operator has his hand in front of the gun to demonstrate that there is no safety hazard with this use of steam, even though the temperature of the steam at the nozzle is 280° F.

Steam spraying coin operated vending machines

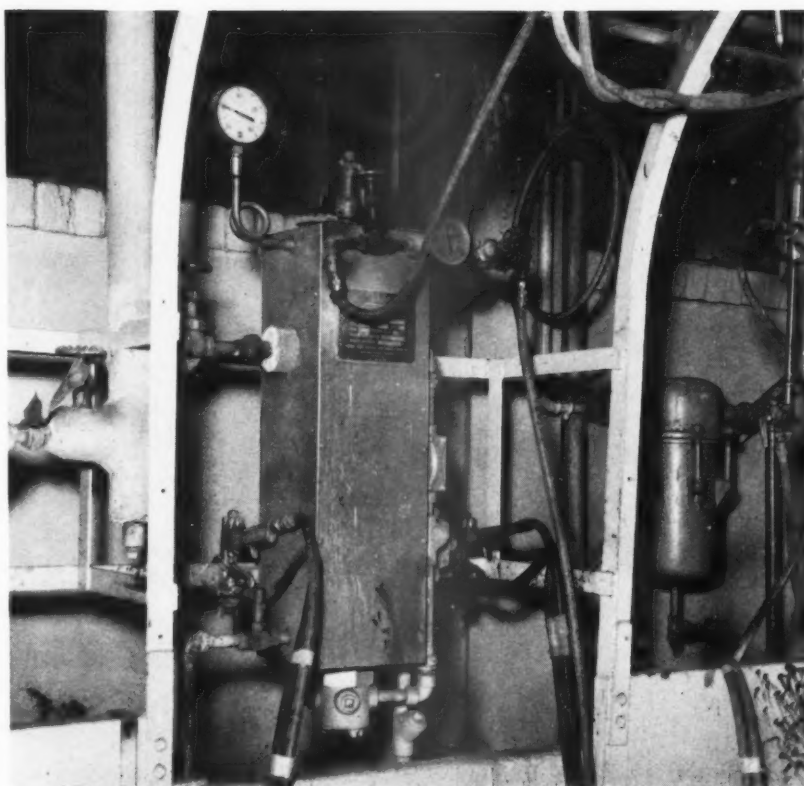
by Elery C. Gibson • MANUFACTURING ENGINEER, ELECTRICAL APPLIANCE DIVISION
WESTINGHOUSE ELECTRIC CORPORATION

STEAM SPRAY, rather than conventional air spray, for the application of organic finishes on vending units at the Westinghouse East Springfield appliance plant, has been in use for some time. The change to steam spraying has provided a number of advantages over air, including:

1. A saving in excess of 20 per cent of all finishing materials has been realized since the steam spray system was installed. This is accomplished as a result of the reduction in overspray and "bounce" of the paints as they hit the work.
2. A reduction in rejects as the finish

is more readily applied on hard-to-get-at corners and flanges without excess build-up of paints and runs.

3. Less fatigue on the part of the spray operators due to the reduction in number of passes of the gun necessary to apply the finish over a given area of work. This is made possible through



Above: A complete two-gun steam spray installation, including the superheater.

Sprayer shows the minimized amount of overspray, or "bounce," of paint when steam spraying.



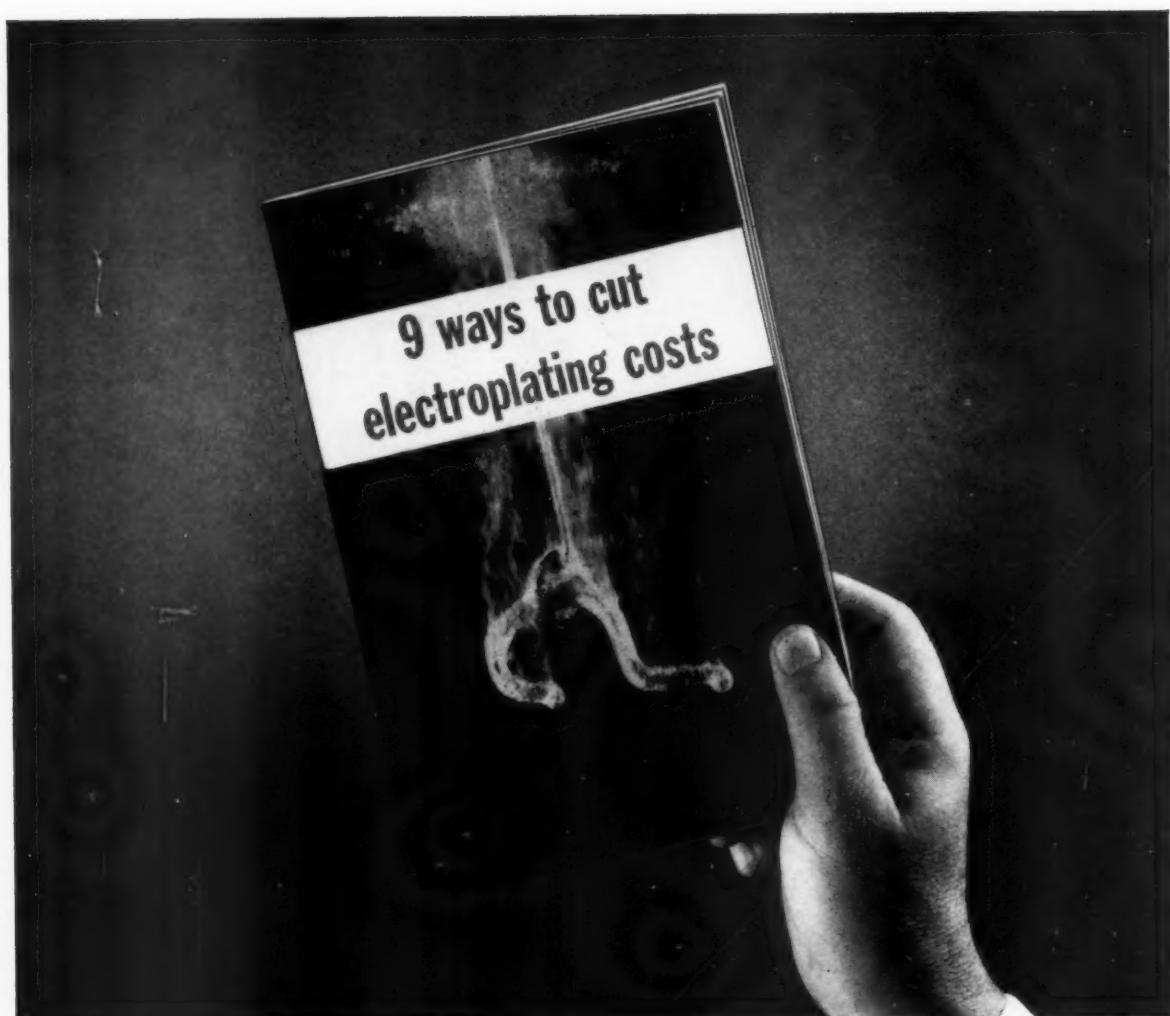
use of a wider fan at the gun.

4. An improvement in the quality and appearance of the finish due to the almost complete elimination of orange peel, dry spray, pinpoints and blisters. Sags and runs are virtually eliminated even when film thicknesses are increased.

5. An increase in film thickness, up to double what air spray normally will apply, can be applied with the same number of gun passes, thus eliminating an extra coat of paint in some cases.

The equipment required for the steam spray process consists of a steam source; either high pressure plant steam or a steam generator; one superheater for every two spray guns (this superheater to have sufficient capacity to produce 95 per cent dry steam at 400 to 450° F); water traps between the steam source and each superheater; special steam spray guns; regular ventilation; special heat resistant hoses; and properly balanced thinners or solvents for the paints to be applied.

If plant steam is available, each two-gun installation will cost about \$1,000. This can be readily amortized by the over 20 per cent savings of finishing materials.



Order your free copy now

"9 WAYS TO CUT ELECTROPLATING COSTS" brings both new and old tricks-of-the-trade together in one handy booklet. These are practical tips and ideas you can use to lower production costs.

Of course, there are many other ways to reduce costs, depending on individual plant conditions. However, this booklet contains helpful reminders on those nine points that Diversey D-Man representatives have found *most vital* in economical electroplating.

The next time your D-Man calls to talk about electrocleaning chemicals, take a few minutes to chat with him about electroplating generally. He is well informed on new products and new techniques you can put to work in your plant.

Meanwhile, send in this coupon for your copy of this new booklet.

to: Metal Industries Division
The Diversey Corporation
1820 Roscoe Street
Chicago 13, Illinois

Please send me your new booklet, "9 Ways To Cut Electroplating Costs."

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Using airless spray system as portable unit

**specialty engineered hose assembly answers
hot solvent problem in airless spray system**

BY using a specially-engineered hose assembly of fluorocarbon resin jacketed in stainless steel wire braid, a difficult design problem in developing the airless system of spray-coating paints, lacquers and other finishing materials was solved.

American Monorail Co., Cleveland uses the system as a portable finishing system for painting structural members for their equipment line.

In contrast to conventional sprayers, which use compressed air as an atomizing force, the airless technique uses pressures of 500-600 psi and temperatures of 160-180° F to hold solvents near the boiling point. When solvents in paints and lacquers are released to the atmosphere, they atomize instantly. The airless spray system, through minimizing overspray, is reported to reduce the required amount of coating material by as much as 50 per cent.

Airless system design

The airless spraying system consists of a piston pumping system, paint heating system, hose and spray gun, integrated into a portable, three-part unit.

A high pressure pump siphons material from the paint container and sends it at selected pressures to the heater. Fluid pressures range from 300 psi for coating oils and lubricants to 1200 psi for plastisols; most paints require 500-600 psi.

At generated pressure the material passes through the 4000-watt heater which elevates and controls the temperature to any predetermined value. For lacquers and vinyls, only 140° F is necessary; solid waxes and resins may require as much as 300° F.

Heat is the key to the airless process — it lowers the viscosity of the material to easily-atomized, watery consistency and builds up vapor pressure to bring solvents to a boiling point. Heated material is circulated at a rate faster than rate of use, assuring a constant supply of hot material to the spray gun.

Advantages claimed for the high temperature airless system are: Minimized overspray; no rebound of paint, even when spraying into trapped area; paint particles hit the surface "hot"; uniform film thicknesses; reduced requirement

to Page 91 →

Miloh Carmichael, American Monorail Company, uses portable airless assembly to spray structural member. Note that spraying can take place in open areas, due to lack of rebound and minimized overspray. Hose lengths up to 100 feet in length may be used between gun and pumping system if required.



Heart of the airless spray system is the pumping unit. High pressure pump sends material through service hose, shown being attached, to heating unit. Fluid pressures range from 300 psi for coating oils to 1200 psi for plastisols. Spray can be held within a few inches of the surface.



The system is suggested for the application of plastisols and other "difficult to spray" coatings.

ACP Granodine[®] IS THE BASE

FOR SPARKLING, DURABLE PAINT FINISHES

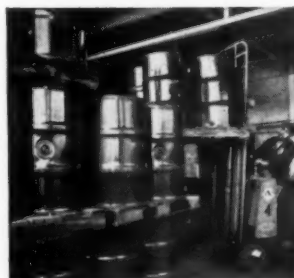


AN AUTOMOBILE requires a durable paint finish that retains its beauty under all weather conditions—ice and snow, sun and rain. ACP Granodine phosphate coating provides an excellent base for such a finish—greatly increases the adhesion of the paint to the metal.

ACP Granodine provides an excellent base for sparkling, durable paint finishes on automotive equipment, home appliances and industrial products by chemically converting steel surfaces to a nonmetallic phosphate coating. It not only greatly increases the adhesion of the finish, but also provides extremely good corrosion resistance even when used in conjunction with a relatively thin and flexible paint film. Granodine coatings are easily and economically applied to steel surfaces by dipping, spraying or brushing.

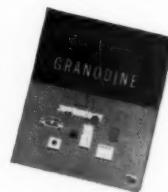


IN THE HOME, ranges, refrigerators, freezers, washers and dryers are among the many products whose sparkling finish is anchored to the metal by Granodine coating.



IN INDUSTRY, drums, materials handling equipment, machine tools and many other steel products used throughout the plant are protected by a Granodine base.

LEARN ALL ABOUT ACP GRANODINE. Bulletin 1380 describes the various types of ACP Granodine and gives information which will help you select the proper type for your particular application. Write for your copy today.



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Industrial Literature

SCREW MACHINE PRODUCTS 1957-58 BUYING DIRECTORY

The 25th Anniversary issue of its Buying Directory, covering the location and facilities of its member companies, has just been published by the National Screw Machine Products Association, Cleveland.

The 1957-58 edition contains 80 pages and is designed to assist buyers in quickly locating sources of supply for their screw machine products requirements. More than 275 companies are listed both alphabetically and geographically for maximum ease of reference.

The Directory is available from Dept. MPM, National Screw Machine Products Association, NSMPA Building, 2860 East 130th Street, Cleveland 20, Ohio.

NEW COLOR FILM ON PRODUCTION BAND MACHINE

"Tooling the Band Saw for Production" describes the versatility of the band saw in the accurate removal of metal. It shows how these cost-cutting machines provide a completely new concept to machining operations requiring shaping, slotting, splitting or facing. Depicts slotting of hydraulic pump rotors with the aid of a simple indexing fixture for moderate production and more elaborate fixturing for automatic operation. These examples typify the many machining applications that can be done faster, more accurately and at lower cost on the production band machine. 16 mm color, sound, 10 minutes. For loan write: Dept. MPM, The DoAll Co., Des Plaines, Ill.

NEW BULLETIN DESCRIBES SELF-LOCKING CAP SCREWS

Self-locking and self-sealing hexagon head cap screws are described in a new bulletin. The bulletin illustrates how cap screws are made self-locking and vibration proof by a patented nylon pellet inserted in the threaded portion of the screws. Cut-away drawings show how Nylock locks and how it seals against fluid leaks.

A table shows the diameter and location of pellets for hex head cap screws

available from stock in sizes $\frac{1}{4}$ " through 1" diameters, fine and coarse threads.

Copies of the bulletin are available from Mrs. J. M. Kinney, Advertising Manager, Dept. MPM, The Cleveland Cap Screw Company, Box 839, Cleveland 28, Ohio.

TESTED FREIGHT BRACING

A four-page folder describes five basic methods of securing rail shipments with steel strapping.

Photographs and diagrams clearly illustrate the floating load, controlled floating load, wall anchored load, open top load and car door bracing. Refrigerator loading is illustrated. A copy may be obtained by writing Dept. MPM, Signode Steel Strapping Company, 2600 North Western Avenue, Chicago 47, Illinois.

NEW CHECK CHART FOR LAMP HOLDERS AND INDICATOR LIGHTS

A new check chart of official style numbers of lamp holders and indicating lights for military applications, with the corresponding DRAKE catalog numbers for each is available from Dept. MPM, Drake Manufacturing Co., 1711 W. Hubbard St., Chicago 22, Illinois.

LIQUID, BAR BUFFING BROCHURE

The most recent developments in liquid and bar buffing and polishing compositions as well as the new Stevens Slo-Slake Lime Composition are featured in a revised 18-page data package prepared by Frederic B. Stevens, Inc., Dept. MPM, Detroit 16, Michigan.

HOW TO USE CAPACITORS

A 12 page booklet describes the why, where and how of industrial capacitor applications. Publication describes units and equipment available; discusses problems and solutions in selection of industrial capacitors, and includes diagrams and pictures.

A brief explanation of how capacitors lower power costs, release system capacity, improve voltage levels and reduce power losses is also included. Write for GEA-5632B, General Electric Co., Dept. MPM, Schenectady 5, N. Y.

BULLETIN ON DRUM CLEANING

Removal of dirt, rust, paint and other foreign materials from drum exteriors, interiors and lids by blasting is described in a new four-page specification bulletin. Contact Dept. MPM, Pangborn Corporation, Hagerstown, Md.

BULLETIN ON RECTIFIERS, RHEOSTATS, LINESWITCHES

Selenium, Germanium and Silicon rectifiers for electroplating, anodizing and all electro-chemical processing are described in a new bulletin.

The warranty and complete features of a Twin-W Rectifier line are covered as well as descriptions of a line of rheostats, line switches and a periodic-reverse plating unit.

Copies of this bulletin are available from Dept. MPM, Frederic B. Stevens, Inc., 1800 Eighteenth Street, Detroit 16, Michigan.

FOUR PAGE FOLDER ON PRESS TYPE WELDERS

A new Pictorial Bulletin, number PTW 5701 on Press type welders and tooling, has just been released.

This bulletin illustrates standard type Press welders with examples of various types of special tooling for increasing production on small to medium size welded assemblies.

Address Dept. MPM, Resistance Welder Corporation, Bay City, Michigan.

NEW CATALOG ON RUBBER PRODUCTS

A new catalog describes and illustrates their facilities for manufacturing rubber parts to customer order, with special emphasis on facilities for the production of molded rubber parts, silicone rubber parts, custom built rubber covered rolls and rubber bonded-to-metal parts.

Included are punched products, gaskets, Natural and Synthetic Rubber Compound Identification tables adopted by the SAE and ASTM, descriptions of natural rubber and synthetics and a helpful guide to ordering rubber products.

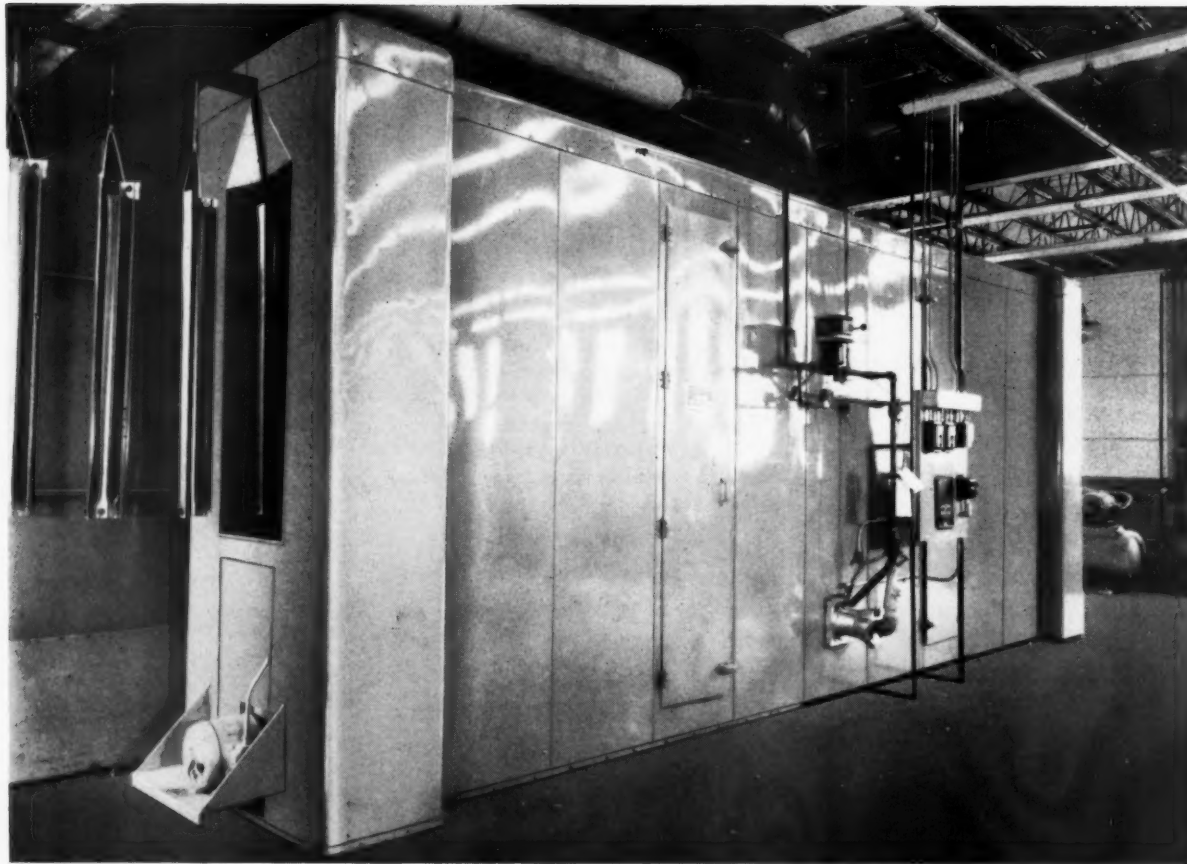
For your copy write to: The Williams-Bowman Rubber Co., Dept. MPM, 1945 S. 54th Ave., Cicero 50, Ill.

HOW TO PHOSPHATE LARGE PARTS BY STEAM GUN

Phosphating of parts too large for tank or spray machine application is the subject of a service report published by Oakite Products, Inc.

to Page 57 →

INTEGRATION



Perhaps you'll agree that one of the most important phases of manufacturing is to blend your production facilities into a smooth-running operation.

This is specially essential in your finishing system. It takes a complete understanding of your product—and the steps to produce the quality of finish required—to successfully integrate finishing ovens, conveyors, washing machines, spray booths, etc. The end result is a profitable, quality product—with a minimum operational cost.

ALWAYS CONSIDER THESE SIX QUESTIONS

- Does the finishing system have capacity for increased production?
- Is the equipment simple enough to allow easy maintenance?
- What type of materials handling is best suited for your process and production?
- Are floor space requirements at a minimum?

- Has the system been engineered for lowest operational cost?
- Does safety equipment provide sufficient protection for your plant and personnel?

MOCO has long given careful consideration to all of these factors—and countless others. Engineering to your specific product requirements is always "the starting point."

When you are considering the purchase of a finishing system—why not consult with a qualified MOCO engineer and learn more about MOCO *Integrated Finishing Systems*.

Here's Valuable Information

This interesting bulletin on MOCO systems is yours for the asking. Why not write today?



FINISHING DIVISION

MICHIGAN OVEN COMPANY

411 BRAINARD, DETROIT 1, MICHIGAN

Finishing Ovens • Dry-off Ovens • Washing Machines • Dip Tanks • Spray Booths • Bonderizing Units • Flo-coaters • Conveyors

Industrial literature

→ from Page 55

The report tells how Oakite CrysCoat solutions, applied through solution-lifting steam guns, simultaneously clean and coat the metal with a fine phosphate film that protects against under-surface corrosion on painted surfaces.

Copies of service report B-6624 are available from Dept. MPM, Oakite Products, Inc., 157 Rector Street, New York 6, N.Y.

NEW MANUAL ON STAINLESS STEEL FINISHING METHODS

R. G. Haskins Co., Chicago, manufacturer of flexible shaft machines and accessory equipment recently issued its new 18 page catalog on stainless steel finishing operations.

Ask for "Stainless Steel Finishing", Dept. MPM, R. G. Haskins Co., 2651 W. Harrison St., Chicago 12, Ill.

BOOKLET ON ELECTROCLEANING

Improved electrocleaning of recesses and low current density areas are the outstanding characteristics of Diversey electrocleaners. Controlled foaming is an added safety feature of this cleaning process. For free copy of this new booklet, contact Dept. MPM, Metal Industries Div., The Diversey Corp., 1820 Roscoe St., Chicago 13, Illinois.

PERFORATED METAL CATALOG

Quality, price and delivery are said to be outstanding when it comes to specifying perforated metals, plastics and hardboards from Standard Stamping and Perforating Co. For a free catalog on a complete range of perforated metals, contact Dept. MPM, above company, 3153 West 49th Place, Chicago 32, Illinois.

HANDBOOK ON PRINTED WIRING

According to a new handbook "UTILIZATION OF PREFABRICATED WIRING", the printed circuit technique offers possibilities for advanced product design and manufacture through: mechanized assemblies, uniform lead dress, unit replacement, simplification and integration components and multiple soldering. Write Dept. MPM, Methode Mfg. Corp., 7447 West Wilson Ave., Chicago 31, Illinois.

SOLVE SPRAY WASHER PROBLEM

"The Recommended Operating, Cleaning and Maintenance Procedure for Pressure Washers" is the title of a booklet which lists equipment and ma-

terials to help solve almost any spray washer problem. There is a cleaner or cleaning method available for practically any purpose. For the free booklet, contact Dept. MPM, Macco Products Co., 9210 South Sangamon St., Chicago 20, Ill.

EXPANDED METAL MESH BOOKLET

Inherently strong and artistically pleasing, expanded metal mesh contributes to the life and practicality of any number of products. Cold-drawn from a solid sheet of metal—aluminum or carbon steel; and, in some meshes, stainless steel—these new expanded metals are strong and rigid, yet light weight and easy to fabricate. Write for a completely descriptive catalog from U. S. Gypsum, Dept. MP-1, 300 W. Adams St., Chicago 6, Ill.

SPECIAL PULLEY DESIGNING REDUCES UNIT COST

By using specially designed pulleys for a particular job such savings as reduced unit cost, saving in weight and long service life can be effected. Whether it be a special or standard pulley need it is possible to save time and money by contacting Nagel-Chase. Send a sketch of the needed part or a description of the application and request the catalog available on pulleys and casters from Dept. MPM, The Nagel-Chase Mfg. Co., 2817 N. Ashland Ave., Chicago 13, Ill.

SOLENOIDS FOR WIDE RANGE OF APPLICATIONS

For a data-packed catalog on solenoids available for a wide range of applications contact Dormeyer. Some of the features of these solenoids are: double shaded coils, to eliminate hammer or excessive A-C hum and chatter and phase timing the plunger's stroke to eliminate any power drop-off. For a complete listing of the solenoids available write Dept. MPM, Dormeyer Industries, 3436 Milwaukee Ave., Chicago 41, Ill.

NEW, 3-TEMPERATURE, WATER MIXING VALVES

New water mixing valves are available that have such features as 3-temperature, non-thermostatic, flow-proportioning water mixing. These valves minimize the effect of inlet pressure variations in the house water system without the added cost of a thermostatic element. For a bulletin on two different valves, a double and a single mix, write

Controls Corp. of America, Dept. MPM, 9559 Soreng Ave. Bulletin SL 10.

SPRAY PAINTING CATALOG

Every piece of equipment and type of material is listed in a new catalog for spray painting. Paint spray guns, air compressors, material handling pumps, oil and water extractors, to name a few, are listed to total over 1100 standard items used in spray painting. Contact Dept. MPM, Binks Mfg. Co., 3122-40 Carroll Ave., Chicago 12, Ill.

ZINC COATED STEEL BOOKLET

Zinc coated steel can be worked and shaped to the very limit of the steel base itself. Its zinc coated "skin" will not flake or peel under even the most severe fabricating stress. Thus, any chance of corrosion is eliminated. Weir-kote zinc coated steel is a material that combines the corrosion resistance of zinc with the proven superior strength of steel. Write Dept. R-19, Weirton Steel Co., Weirton, W. Va. for free booklet.

BULLETIN DESCRIBES WAYS TO ACHIEVE BETTER FINISHES

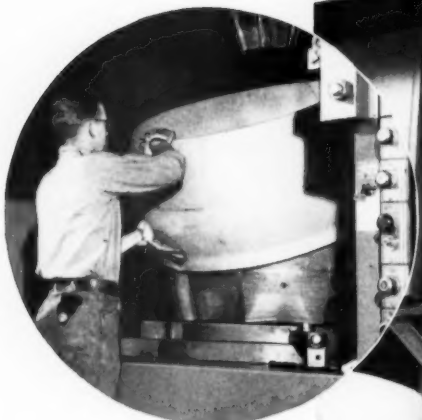
In one case a manufacturer made a saving of 56 man-hours by installing a new system of baking paint. The entire system was engineered, built and installed by specialists in the field of industrial finishing ovens. Write for Bulletin 51 with 16 pages on modern ways to achieve better finishes from Dept. MPM, Despatch Oven Co., 619 S.E. Eighth St., Minneapolis 14, Minn.

HOW TO PREVENT IRON SPOTS IN ENAMEL COVER COATS

Iron spots in porcelain enamel cover coats is one of the bugaboos of the industry. One of the most efficient and fool proof methods of preventing iron spots is with a magnetic filter. For complete information on how this can be done send for bulletin 54E, Dept. MPM, S. G. Frantz Co., Inc., Brunswick Pike & Kline Ave., P.O. Box 1138, Trenton 6, N. J.

EXTRUDED ALUMINUM ASSEMBLY AND FABRICATION BOOKLET

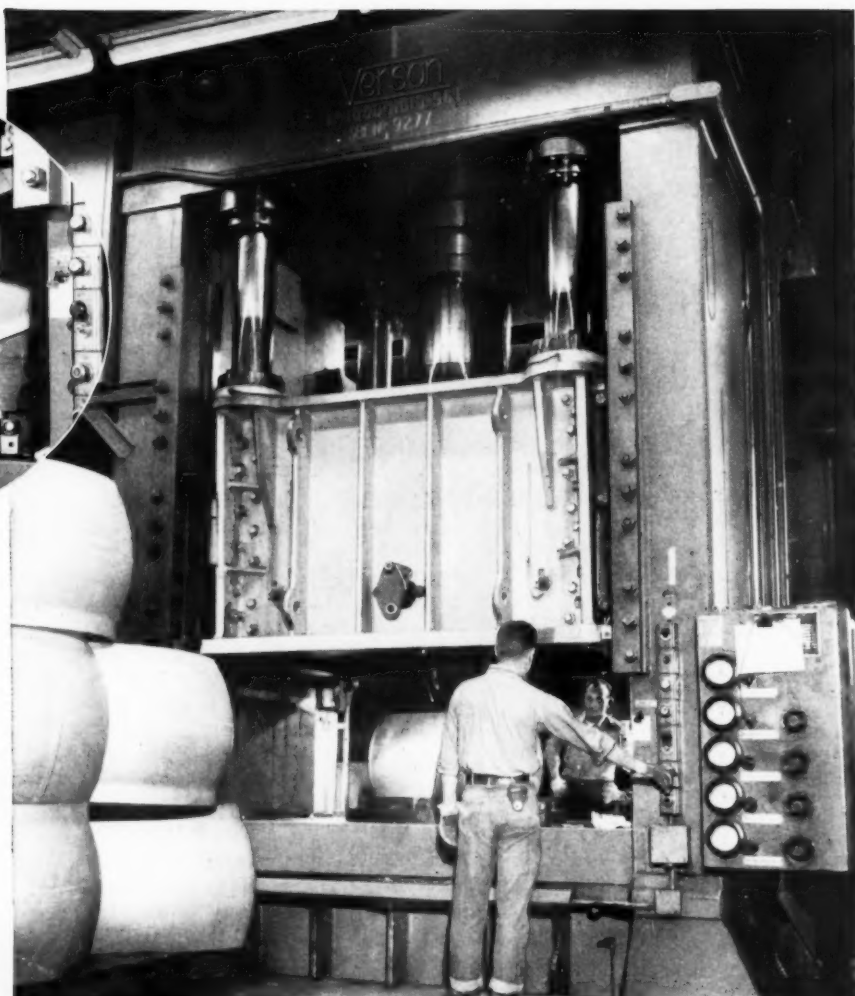
Extruded aluminum parts of all types including escutcheon plates, border strips and framework can be made to customer's specifications. A booklet showing examples of these and anodizing and silk-screening on aluminum is available. Contact Dept. MPM, Light Metals Corp., 1215 Monroe, N. W., Grand Rapids, Mich.



Close-up of die space shows special expander die used in forming metal to smoothly rounded shape.



Nozzle support for J57 after burner is formed on Verson 1000 ton double action hydraulic press at Solar-Des Moines.



Another **Verson** Press proves its versatility

... forming jet engine components at Solar Aircraft Company

This is Verson versatility at work . . . a 1000 ton Verson double action hydraulic press . . . "workhorse" at Solar Aircraft Company's Des Moines plant.

Solar produces components for jet and turbo-jet engines which power a number of our best known aircraft. They are also engaged in the manufacture of components for guided missiles. To this end, a variety of tasks are assigned to this Verson Press, including heavy duty expanding, sheet metal embossing and deep drawing.

Forming is done primarily with 300 series or 410 stainless steels, ranging in thickness from .031 to .093.

The double action press, largest of its type at Solar-Des Moines, has proved a rugged and versatile production tool. In addition to the heavy jobs, it handles general production when needed.

Big job . . . small job . . . there's a Verson press for you. For specific recommendations send an outline of your requirements.

A Verson Press for every job from 60 tons up.



ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

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New

Supplies and Equipment

NEW GE FAN AND LIMIT SWITCH IS 50 PER CENT SMALLER



A new fan and limit switch that is 50 per cent smaller than previous models has been developed by the General Electric Company's Appliance Control Department for gas or oil fired domestic heating systems.

Combined in one enclosure are the necessary components to control the fan or blower operation and also act as a safety limit control. Two separate control units mounted in the same enclosure are claimed to give a wider, faster, and more accurate response than the previous unit for all types of enclosures, according to company engineers. For further information contact Dept. MPM, General Electric Company, Schenectady 5, New York.

AIR OPERATED BOTTOM STAPLER

In addition to setting-up regular and end-slotted containers, as well as overlap cartons, when the arm is attached, this machine can erect telescope boxes, staple Jiffy bags, multi-wall bags, set-up flat pieces of interior packaging, or staple flat pieces of board together.

There are no electrical connections and no moving parts in the stapling head, which means no down time due to electrical failure. For further information contact the Container Stapling Corp., P. O. Box 247, Herrin, Ill.

NEW, LOW-COST STAINLESS

STEEL SHEET

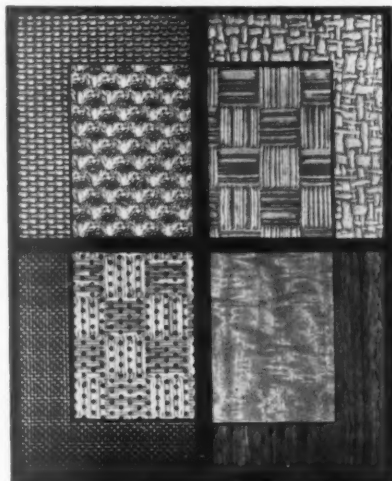
A new stainless steel sheet that successfully withstands operating tempera-

tures as high as 1500° F. and costs as much as 50 per cent less than solid stainless, has been developed by Chromalloy Corp.

The Chromalloy process involves the diffusion of chromium into the surface of steel where an iron and chromium atom exchange takes place, forming a stainless surface integral with the base metal. Since the high temperature is followed by slow cooling, the sheet becomes fully annealed at the same time.

The company claims its newly-developed product is more easily worked than solid stainless steel sheet and can be bent, drawn, swaged, formed, spun, or welded without peeling or cracking. For more information contact Dept. MPM, Chromalloy Corp., 450 Tarrytown Road, White Plains, N. Y.

EASE OF FABRICATION OFFERED BY NEW PLASTIC LAMINATE



Economies ranging from 35 to 75 per cent, matchless ease of fabrication, permanence and sculptured beauty, according to the manufacturer, are offered to users of bright plated metals, wood veneers, grained or textured plastics as well as acoustical materials by Pearsonite, a basically-new plastic.

The new material behaves like light-gauge sheet metal and faithfully retains the most detailed three-dimensional forms. Pearsonite will not burn, is almost completely chemically inert, and resists abrasion from continued hard

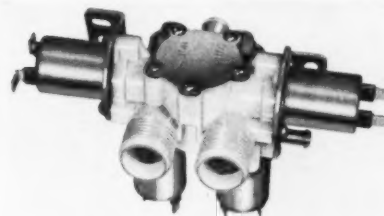
use. It is virtually acoustically transparent and a good electrical insulator.

Pearsonite is manufactured in 40" and 48" wide continuous rolls of up to 100 yards. It may also be obtained in large production sheet sizes: 40" x 36", 40" x 43", and 48" x 96". Samples and detailed literature are available on request. Contact Dept. MPM, Metallic Plastics Corporation, 27-10 44th Drive, Long Island City 1, N. Y.

CONTROL FOR METAL CLEANING AND CYANIDE COPPER BATHS

An improved, safe addition agent, "Alkontrol," to replace the commonly-used sodium hydrosulphite, has been announced as a control for metal cleaning and cyanide copper baths. According to the report, "Alkontrol" reduces the troublesome hexavalent forms of chrome contamination to harmless ones, and its long-term effectiveness relieves plant operators from constant attention and frequent additions to their cleaning baths. When used in a copper strike, the material is said to improve the deposition on copper casting patterns, improve plating in low current density areas, and eliminate some causes of blistering. Write Dept. MPM, Northwest Chemical Co., Detroit, Mich.

THERMOSTATIC WATER MIXING VALVE FOR LAUNDRY UNITS



To add a greater range of temperature selection to automatic washer-dryer units, a new thermostatic water mixing valve has been developed. This new valve is said to enable manufacturers to design an automatic washer-dryer with 5 temperature plus 1 auxiliary temperature for operation of dryer condenser or accessories. Contact Dept. MPM, Detroit Controls, Div. of American Standard, 5900 Trumbull Ave., Detroit 8, Mich.

leading auto manufacturers
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QUARTZ OVENS

Here's Why...



CLEPCO Quartz Paint Ovens are based on the use of special CLEPCO Quartz Heaters designed to emit that part of the heat spectrum most readily absorbed by paints.

Another major auto manufacturer reports that CLEPCO Paint Ovens are lower in original cost as well as in operating costs than the conventional gas fired convection ovens previously in use.

CLEPCO'S Complete Research Facilities are at your service to determine the most efficient quartz oven for your requirements.

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INVISIBLE MOBILITY!

Yes, there's a sturdy set of casters under this cabinet, but you wouldn't know it! That's because they are Nagel-Chase casters mounted in Nagel-Chase brackets designed for use inside console type cabinets and to conceal the caster effectively. Cabinet sets close to the floor.

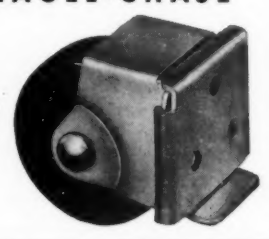
Both swivel and non-swivel type casters, used in pairs, provide easy, ready movement for console style buffets, side-boards, TV and Hi-Fi cabinets. Write for Nagel-Chase Caster Catalog today.



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The NAGEL-CHASE MANUFACTURING CO.

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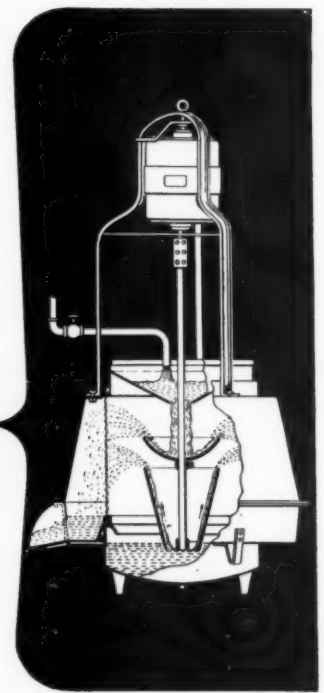


ROTOSPRAYING ... A Standard at Kohler!

● Kohler of Kohler has been using Rotospraying as a method of sieving vitreous glaze for years. They have recently ordered Rotosprays for their new Spartanburg, South Carolina pottery—proof of their confidence in Rotospray equipment.



● Check your plant today and make sure that you have the correct number and size of Rotospray units for efficient operation.



ROTOSPRAY MANUFACTURING CO.
562 W. WASHINGTON BLVD. • CHICAGO 6, ILLINOIS

RUBBER WHEEL CLEANS, BUFFS, AND SURFACE CONDITIONS



An efficient buffing wheel, consisting of 17 rubber pads of special design, has been perfected.

This Kwik Kleen Buffer is completely safe, according to the manufacturer, and can be used without shield on rubber, plastics, and other soft materials. It has proven ideal for the removal of flash and trim from production molded rubber and plastics parts. Long wheel life is experienced without surface burning, scorching, or scratching.

For further information, write direct to Dept. MPM, James Back & Associates, P. O. Box 532, Riverdale Station, Dayton 5, Ohio.

STRIPPER FOR EPONS AVAILABLE

A solvent-acid stripper, called "S-A," has been designed to strip high-grade epoxies and other tough finishes, according to the manufacturer. Inhibited for safety on all metals except magnesium during the recommended stripping period, the compound has been reported proven in use, stripping tough finishes in 10 minutes, and removing a wide variety of resistant paints in from 1 to 5 minutes. It is also claimed to remove light rust, scale, and smut deposits. The material is used at room temperature, and at full strength. It is rinsed with hot or cold water, and has no flash point, therefore presenting no fire hazards. Dept. MPM, Oakite Products, Inc., 117 Rector St., New York 6, N. Y.

NEW STACKING CHUTES

A new line of stacking chutes has been developed to carry and stack stampings up to 20 feet away from the presses. Stampings that are springy or delicate are automatically transported from the presses to packaging or assembly lines without fear of damage to the product or to the dies. For further information contact Dept. MPM, Clark Industries, Delaware, O.

SMALL ABRASIVE BLAST CLEANING TABLE INTRODUCED

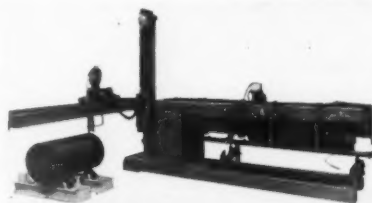
The manufacturers of blast cleaning and dust control equipment have introduced a small 4-ft Rotoblast table room for cleaning all types of work in foundries and plants that require a small, flexible machine for a wide range of cleaning operations. Castings, forgings, and stampings up to 48" diameter x 24" high, as well as plastic and composition materials, can be blasted in this unit.

A single overhead Rotoblast wheel, powered by a 10-hp motor, will throw 15,000 lb. of abrasive per hour, and for extra cleaning capacity, an optional 15-hp motor is available that will throw 22,000 lb. of abrasive per hour. For



maximum abrasive efficiency, a self-contained automatic elevator and separator continuously clean used abrasive for recirculation to the Rotoblast wheel. Engineering and application information may be obtained from Dept. MPM, Pangborn Corp., Hagerstown, Md.

AUTOMATIC WELDING UNIT FOR CYLINDERS



A new product that facilitates the dual use of automatic welding equipment for the welding of metal cylinders and tanks of all kinds has been introduced. The automatic welding head is mounted on a carriage in such a manner that the welding of longitudinal seams is accomplished while the cylinder is clamped in a copper back-up, air-clamped seaming fixture. For more information contact Dept. MPM, Pand-

jiris Weldment Co., 5151 Northrup Ave., St. Louis 10, Mo.

NEW AUTOMATIC METAL SHEAR

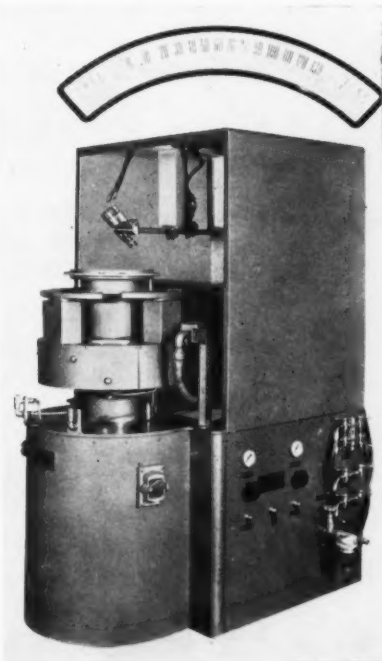
General Products Company of Fredericksburg, Virginia, has developed a new automatic metal shear to be marketed under the trade name, "Plant-master". This machine decoils, straightens, shears and stacks in one swift operation. Because of its improved method of feeding and straightening, it reportedly requires considerably less floor space than shearing machines currently on the market. Write Dept. MPM, General Electric Co., Fredericksburg, Virginia.

AUTOMATIC SPRAY FOR DECORATING DIALS

A new air-operated, electrically-controlled machine just developed by Conforming Matrix Corp. automatically spray-decorates dials at a high production rate.

The machine features three square shaft air cylinders which clamp the part firmly against the metal masks during the spraying operation to assure a sharp paint line. Three pieces are loaded at a time and the drum revolves during painting.

The machine has complete safety control for stopping at any position, also regulation of machine air and atomization air for the spray guns. Descriptive literature will be sent to anyone addressing their request to Dept. MPM, Conforming Matrix Corp., 381 Toledo Factories Building, Toledo 2, Ohio.



Look to Wyandotte for the

ALUMINUM

ETCHING

MIL-ETCH — Etches rapidly at low concentrations; gives uniform, fine-grained etch. No scale or sludge. Long life, simple control, no excessive foam or fumes, nondusty to handle.

CLEANING

ALTREX* — Nonetching, heavy-duty soak cleaner with long life, high detergency. Excellent for cleaning before anodizing, chemical film treatment, or preparation for spot welding.

SPRAY-ALTREX — Spray cleans without etching, has new low-foaming detergents. Easy to control, it works well in all kinds of water.

WYANDOTTE 468 — Neutral, solvent-type cleaner. Miscible with either hydrocarbon solvents or water. Removes oil, buffing compounds, drawing compounds without etching.

DESMUTTING

WYANDOTTE 2487 — Brightens aluminum alloys that darken in alkaline etching processes. Safer than acids; permits close control of desmutting bath. Easy-to-handle granular form; makes solutions of long life.

BRIGHTENING

I-2767-C — For brush or spray application; used as received or diluted with water. Brightens aircraft, truck trailers, aluminum equipment uniformly, rapidly without corroding surface.

PHOS-IT* — Liquid, phosphoric-acid-type product. Removes heavy corrosion quickly, brightens at the same time. Used diluted with water. For brush or dip application. Has high detergency, rapid action, low use-cost.

BARREL FINISHING

ALTREX — For deburring and radiusing with stones or chips. Offers excellent cutting qualities and economy.

BURNEK* 22 — For ball burnishing. Provides real economy for short and medium runs.

DEOXIDIZING

WYANDOTTE 2487 — Provides excellent preparation for spot welding. Gives uniformly low contact resistance on practically all alloys. No heat or close temperature control necessary. No appreciable surface etching. Work can be stored up to 96 hours before welding. Simple control.

best in products for

FINISHING

PAINT PREPARATION

PRE-FOS* — Cleans and prepares all alloys for paint. Adaptable to spray-washer or soak-tank use. Surface is uniformly conditioned to provide superior paint adhesion and corrosion resistance.

PHOS-IT — Excellent for wipe-on, wipe-off cleaning and paint preparation. Gives fine etch or "paint tooth," which results in an excellent paint bond.

Dependable Wyandotte products give you better results, shorten maintenance time, reduce operating costs. Send for free technical literature on the Wyandotte products designed to fit your aluminum-finishing operations. Or call in a Wyandotte representative, today. Wyandotte Chemicals Corporation, Wyandotte, Michigan. Also Los Nietos, California. Offices in principal cities.

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PAINT STRIPPING

P-1075 — Fast-acting, nonflammable, room-temperature liquid paint stripper with a water seal. Removes most paint finishes without attacking aluminum. Economical — gives extra-long service life.

444-C — Removes paint from large parts or objects quickly. A thickened product for brush or flow-on stripping. Penetrates multiple coats of finishing materials with one application; is nonflammable, water rinsable.

SUPERSOLVE — Removes hard-to-handle enamels and other finishes quickly, without attacking metal. Used hot, diluted with water. Rinses easily.



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THE BEST IN CHEMICAL PRODUCTS FOR METAL FINISHING

WYANDOTTE CHEMICALS CORPORATION

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Please send me more information on the following aluminum-finishing operations:

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| <input type="checkbox"/> Cleaning | <input type="checkbox"/> Deoxidizing |
| <input type="checkbox"/> Desmutting | <input type="checkbox"/> Paint Preparation |
| <input type="checkbox"/> Brightening | <input type="checkbox"/> Paint Stripping |

Name _____ Title _____

Firm _____

Address _____

City _____ Zone _____ State _____

Effect of metal characteristics on forming and welding

(Continued from Page 37)

carbon sheet is specified, DQ sheet is requested.

There are other specifications of which brief mention will be made. Thus, cold rolled strip can be specified in accordance to edge type. It may be also necessary to specify "Non-Scalloping Quality" strip; this strip is intended to have no marked degree of unevenness or "ears" of a deep drawn shell. In the event that roll forming is intended, it may be necessary to specify "Non-Fluting Quality" in order to avoid kinking of the material during fabrication.

Failure during fabrication can be traced more often to practice than to material deficiencies. In the former case, failure may be traced to improper die design, poor choice of clearance values, too much deformation between regenerative anneals, or improper lubrication or hold-down pressures. Breakage attributed to metal deficiencies are usually gross such as exemplified by internal seams and inclusions and even evidences of pipe; these defects are easily determined in the initial stages of fabrication. The production of surface markings that are objectionable, which is a result of aging, is usually a fabricator's risk since it is assumed that he is aware of this phenomenon and the conditions under which it appears. If the economics warrant, aging can be eliminated by the use of killed steel.

The grain size has become one criteria linked to the formability of the carbon steels; this being especially true for severe working operations. Thus, an optimum grain size of 100 grains per square inch is usually considered essential for deep drawing operations. A grain size finer than this optimum value is usually too hard to obtain large reductions, whereas, a grain size that is larger may cause an "orange peel" effect on the surface of the drawn part. Of interest is the relationship between grain size and Rockwell B hardness as given in Table 3; this method of control can easily be established in an individual plant. Grain size of 200 to 385 are recommended for simple bending operations in the harder tempers. Steels with a grain size of 180 to 192 lend themselves readily for roll forming operations where fluting is undesirable and a certain amount of springback is required. A grain size of 145 is also recommended for roll forming without fluting where the operation requires a

minimum amount of springback. Steels that have a grain size of about 48 are decidedly undesirable due to the pronounced tendency toward orange peel and subsequent difficulty of removal in finishing operations.

Cup test valuable

Although specific forming methods will not be discussed since this phase has been adequately covered in a previous series of articles by the author that appeared in *Finish* recently, a discussion in the evaluation of deep drawing qualities of incoming raw materials will be given. Due to the characteristics of the deep drawing operation, emphasis is placed on both the tensile test and the Ericksen or Olsen cup test procedure. In a tensile test, where elongation is used as a criteria for ductility and subsequent ability to deform by deep drawing, difficulty is experienced in obtaining slight differentiations that may affect success or failure of the drawn part. This inability to weed out borderline material is probably due to the fact that the stretching experienced in a tensile test is in a uni-axial direction, whereas, in a typical drawing operation, the stresses imposed are in, at least, a bi-axial direction, and often they are in a tri-axial direction. This test is of value in determining yield point, the rate of cold working and the variation of properties in both the transverse and longitudinal direction. To realize inter-changeability of data, the test should be performed in accordance to an ASTM standard so that the variables of testing are at a constant value.

In the author's opinion, the cup test can be developed with sufficient sensitivity to evaluate. Of interest is the work of Boulger and Dahle who devised a cup testing procedure in evaluating drawing quality steels; the success being attributed to the design of the testing apparatus so as to simulate as much as possible the distribution of stress that occurs in a deep drawing operation. In addition, they compared lots that had been tested in the laboratory to the actual performance experienced in the shop. The results that these authors obtained were reported as "cup drawing indices"; these indices being the item of evaluation of the material that was subsequently formed in production. They concluded that; (a) as the cup values increased as indicated by labora-

tory test procedures, the incident of breakage in production decreased when the comparison was made in the forming of identical shapes; (b) that an increase in either carbon and/or sulfur within the base material evaluated lowered the "cup drawing indices" which reflected in the shop as an increase in failures; (c) that variations in manganese, copper, and phosphorous within the range of the available materials did not materially affect the "cup drawing indices"; and (d) that the performance obtained in production did not always correlate with the standard elongation values obtained in tensile testing of the material in question, or the cup values obtained in the standard Olsen test.

However, the Olsen cup test has been used by the author for the evaluation of deep drawing materials, and in a period of six years, the separation of acceptable and rejectable material has proven to be successful. The basic procedure employed would consist of first classifying component parts on the basis of severity of forming. On the basis of previous experience, a maximum and minimum cup value was given to each classification; these limits being modified as the test procedure was developed. The accuracy in prediction increased as the comparison data between these cup values and shop performance increased. Its value was proven at a time when warehouse material of doubtful quality had to be purchased to feed a high productivity; each lot being classified as to a "severity of forming" basis which utilized a major portion of the material so purchased.

There are other test procedures that have been proposed for the evaluation of material among which would include the wedge test, the "tear length" test to determine the severity of directional properties, and the recording torque magnetometer which obtained a measure of the grain orientation which indicates the drawability of the material.

NEXT MONTH

Part II of Effect of Metal Characteristics on Forming and Welding will cover the welding portion of this important subject. It will cover the various methods of resistance welding and the attendant effects with each type of metal. Essential rules for the weld design will be given for projection welding. Complete information on seam welding will also be given.

INDUSTRY PERSONALS

Benjamin Electric Mfg. Co., Des Plaines, Ill., announced the appointment of *George F. Niemann* as director of manufacturing. In his new position, he will control all manufacturing procedures of the company. Niemann was formerly works manager of the company which manufactures industrial and commercial lighting equipment and has extensive fabricating and finishing facilities.

Borg-Warner International Corporation announces the appointments of *Marshall A. Haislup* as Industrial Sales Manager, of *Elmore T. McKenzie* as Appliance Sales Manager, and of *John D. Gulick* as Automotive Sales Manager.

Haislup was formerly Industrial Products Manager, McKenzie was Appliance Service Manager, and Gulick was Regional Sales Supervisor for Latin America.

Gerald E. Ankeny has been named general sales manager of the Maytag company, effective Sept. 1, it was announced by *Claire G. Ely*, vice-president-elect in charge of marketing for the appliance manufacturing firm.

Ankeny, who has been assistant sales manager, succeeds Ely, who recently was elected vice-president to succeed *Roy A. Brandt* upon his retirement Sept. 1.

The new general sales manager began his Maytag career in 1952 as a regional manager at Akron, Ohio. After moving to Cleveland, he was appointed assistant branch manager of the Richmond branch the following year. He was named assistant sales manager for the company Sept. 1, 1954.

Kathryn Falb, 21, of Postville, Iowa, began work recently in the home service department of the Maytag company here as the company's second home service trainee.

Miss Falb is participating in a training program recently developed to familiarize new Maytag home economists with all Maytag appliances and company operations.

The appointment of *Edward Derenia* as National Manager of the Built-In Division of O'Keefe & Merritt Co. was announced by *Gordon Boyle*, Vice-President. *William LaTourette* will continue in his capacity as Local Manager, Built-In Sales, directing sales activities in Southern California and Arizona, the announcement states.

Robert W. Thomas, 36, a member of The Trane Company Los Angeles office since 1950, has been promoted to manager of the firm's New York office. Thomas joined Trane in 1949 shortly after receiving an engineering degree at the University of Southern California.

H. P. Spackman, 58, president and chief executive officer of Lyon Metal Products, Incorporated, passed away August 20 in St. Vincent's Hospital, New York. He had been a patient there during the preceding few weeks.

Archer W. Richards, Chairman of the Board and General Manager of Designers for Industry died at St. Luke's Hospital in Cleveland on August 16th at the age of 72.

Prior to his association with Designers for Industry, Richards had served as Factory Manager of the Grigsby-Grunow Company; Managing Director for Thor Canadian Company; General Manager of the Geometric Stamping Company and President of the Vacuette Distributing Company.

William B. Cott has been named assistant to the vice president of Westinghouse Electric Corporation's air conditioning division at Staunton, Va., it was announced by *Bruce D. Henderson*, vice president and division manager.

Robert M. Oliver, vice president in charge of marketing, Thomas A. Edison Industries, a division of McGraw-Edison Co., has resigned to form his own marketing business, it was announced recently.

Oliver, a sales, advertising, and marketing executive in the electrical industry for 31 years, soon will establish a marketing counseling service, headquartered at Phoenix, Ariz.

Harold B. Donley, manager of distribution, Bryant Manufacturing Co., a subsidiary of Carrier Corp., is leaving the company to form his own marketing consulting business, it was announced recently.

Donley has been active in the marketing, sales, and management of air conditioning and heating equipment, major appliances, electric housewares, and radio receivers for 36 years. He began his business career in 1921 with Westinghouse Electric Corp., Mansfield, Ohio.

J. F. O'Donnell was recently made manager of major accounts for the Westinghouse major appliance division. He succeeds *W. B. Creech*, who has been named manager of the company's newly formed service division. Mr. O'Donnell will supervise activities of the following departments: national accounts, utility sales, furniture and department store sales, key accounts and Westinghouse International Company sales.

Two engineers, *Jack Hatcher* and *Richard Ward*, recently started work at the Maytag company in Newton. Hatcher has assumed duties as a chemical engineer in the process control laboratory and Ward is employed in the industrial engineering department.

Michael Bender has been appointed metallurgist and welding engineer with Blaw-Knox Company's Bufflovak Equipment Division, Buffalo, N. Y. The Division produces chemical and food processing equipment.

In his new position he will develop all Division welding procedures, advising and assisting the engineering, manufacturing, inspection and sales departments on metallurgical and x-ray problems, welding techniques, material and equipment.

The appointment of *Thomas P. Hyde* as national service manager of Norge Division, Borg-Warner Corporation, Chicago, was announced recently by *Elmer G. Fenton*, director of national service. Hyde will be responsible for Norge distributor, dealer and field product service matters. He will coordinate activity of Norge national service product specialists.

Paul W. Wyckoff, chief engineer, will assume direction of all engineering activities for the Airtemp Division of the Chrysler Corporation, Mr. *Buchholzer*, president, of Airtemp, has announced.

Tom Steinbach has been appointed to the staff of Reinecke and Associates as planning director, it was announced by *J. O. Reinecke*, head of this firm of industrial designers.

Steinbach has been serving as an independent design consultant. Previously he was executive designer with Raymond Loewy Associates for six years, he was connected with Hotpoint Co. for five years as designer of major appliances and chief designer of ranges, and was in charge of the Industrial Design Department of the Illinois Institute of Technology.



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150TH AND LEXINGTON AVENUE • HARVEY, ILLINOIS

A Member of the Alloy Casting Institute

Thomas W. Schaid has been appointed manager of Allmetal Screw Products Company's new Midwest Division. Headquarters for Allmetal Midwest Division are located at 5611 West Lake Street, Chicago 44, Illinois.

Allmetal (manufacturer of stainless steel screws, nuts, bolts, washers, rivets, etc.), announced that the regional office is to service the area comprising Illinois, Indiana, Iowa, Minnesota, Missouri, Nebraska, North and South Dakota, and Wisconsin.

C. J. O'Sullivan has been assigned to the New York district office of the chemical sales division, Shell Chemical Corporation, D. P. Jones, district manager, announced recently.

O'Sullivan will be a technical representative, concerned primarily with sales of the company's Epon resins in metro-

SUPPLIER PERSONALS

politan New York and Long Island. He was formerly at the company's technical service laboratory in Union, New Jersey.

The appointment of *Armin M. Elbert* as chairman of the finance committee of Controls Company of America was announced recently by Louis Putze, president. Elbert, who had been treasurer, is succeeded in that position by *John P. Ruane*, formerly controller. *Ernest A. Weberling*, assistant controller, becomes controller.

David C. Verson, president of Verson Allsteel Press Co., Chicago, has announced the appointment of *N. J. Kassnel* as district manager of Verson's

newly-opened Cleveland sales office situated at 5530 State Rd., Cleveland, Ohio. Kassnel, vice president of the Verson company, has already assumed his duties at the new headquarters which may be reached by phoning SHadyside 1-3373.

Appointment of *Beverly D. Taylor* as treasurer of Robertshaw-Fulton Controls Company was announced by Thomas T. Arden, president. Taylor formerly was controller.

Walter H. Steffler, who resigned as treasurer, will continue as the company's secretary. *John C. C. Byrne*, controller of the company's Grayson Controls Division, has been named controller. *James A. Witt* has been appointed assistant secretary.

K. Emerson Wilhelm has been appointed to the new position of regional sales manager, Coated Abrasives Divi-

SCHAIID



O'SULLIVAN



ELBERT



RUANE



KASSNEL



TAYLOR

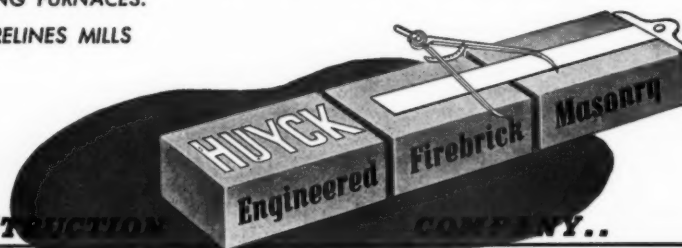


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sion, Armour and Company, for Northern Ohio. He will make his headquarters in Cleveland.

Tracy Gilbert has been appointed sales supervisor, Coated Abrasives Division, Armour and Company, Alliance, Ohio.

Irving Sarlin, president of John B. Moore Corporation, Nutley, N. J., manufacturers and distributors of solvents, announced that John B. Moore has been appointed their sales representative for all the Southeastern states, with headquarters in Miami.

Donald W. Reagan has been named Los Angeles district manager for B. F. Goodrich Industrial Products Co., Akron, Ohio. Reagan goes to Los Angeles from the company's San Francisco district where he has been employed for the past five years as special field representative.

J. O. Ross Engineering Corp., designers and builders of industrial drying and baking ovens and systems, announces the addition of Benjamin P. Shiller to its sales staff. Shiller will make his headquarters at the Detroit office of Ross Engineering.

Edward M. Grady has been named sales manager of mill products, Western Brass Mills division, Olin Mathieson Chemical Corporation, David T. Marvel, vice president for sales, announced recently. Grady had been assistant to the vice president for sales.



SHILLER



GRADY

Carl C. Clabaugh, Manager, Metal Finishing Chemicals Department of Cowles Chemical Company, Cleveland, Ohio, announced three appointments recently. Arthur W. Coapman, Wilbert M. Radtke, and Homer E. Welch have been selected as the new Cowles technical men servicing Cowles Alkaline Metal Cleaners and Ty-Bond Zinc phosphate metal coatings.

Coapman will handle the sales and services in Detroit and nearby cities, Radtke in Indiana, and Welch in out-state Michigan.

METAL PRODUCTS STATISTICS

a current report on available production, shipment and sales figures for important products in the appliance and fabricated metal products manufacturing field

GAS WATER HEATERS — July shipments 206,400, 11 per cent below '56; January-July inclusive 1,538,600, 11.3 per cent below '56.

GAS RANGES, BUILT-IN — July shipments 12,400, 0.8 per cent over '56; January-July inclusive 102,800, 14.3 per cent over '56.

GAS RANGES, FREE STANDING — July shipments 121,800, 17.0 per cent below '56; January-July inclusive 1,000,300, 13.6 per cent below '56.

GAS FURNACES — July shipments 60,000, 16.7 per cent below '56; January-July inclusive 364,900, 14.4 per cent below '56.

GAS FIRED BOILERS — July shipments 9,800, 53.1 per cent over '56; January-July inclusive 46,500, 7.1 per cent over '56.

GAS CONVERSION BURNERS — July shipments 14,300, 29.2 per cent below '56; January-July inclusive 64,600, 22.1 per cent below '56.

ELECTRIC REFRIGERATORS — July shipments 318,000, 9.4 per cent below '56; January-July inclusive 2,121,800, 12.8 per cent below '56.

ELECTRIC FREEZERS — July shipments 109,100, 3.9 per cent over '56; January-July inclusive 580,300, 6.9 per cent below '56.

ELECTRIC RANGES, BUILT-IN — July shipments 32,000, 8.6 per cent below '56; January-July inclusive 246,200, 7.3 per cent over '56.

ELECTRIC RANGES, FREE STANDING — July shipments 56,700, 35.0 per cent below '56; January-July inclusive 557,200, 28.3 per cent below '56.

ELECTRIC WATER HEATERS — July shipments 64,000, 15.0 per cent below '56; January-July inclusive 456,700, 16.9 per cent below '56.

ELECTRIC DISHWASHERS — July shipments 27,400, 12.2 per cent below '56; January-July inclusive 218,700, 15.9 per cent below '56.

ELECTRIC FOOD WASTE DISPOSERS — July shipments 40,100, 13.9 per cent below '56; January-July inclusive 296,300, 19.8 per cent below '56.

COMBINATION WASHER-DRYER — July factory sales 10,042, 19 per cent above June; no comparable '56 figures available.

WASHERS, AUTOMATIC & SEMI-AUTOMATIC* — July factory sales 268,708, 11 per cent below '56; January-July inclusive 1,543,310, 18 per cent below '56.

WASHERS, WRINGER & ALL OTHER — July factory sales 66,431, 16 per cent below '56; January-July inclusive 496,087, 26 per cent below '56.

ELECTRIC DRYERS — July factory sales 51,666, 44 per cent below '56; January-July inclusive 374,048, 30 per cent below '56.

GAS DRYERS — July factory sales 18,345, 26 per cent below '56; January-July inclusive 159,974, 14 per cent below '56.

IRONERS — July factory sales 1,682, 53 per cent below '56; January-July inclusive 22,817, 25 per cent below '56.

VACUUM CLEANERS — July factory sales 218,276, 16 per cent below '56; January-July inclusive 1,828,806, 15.8 per cent below '56.

METAL FURNITURE — July shipments were 47 per cent over '56; January-July inclusive was 9 per cent below '56.

TELEVISION — June shipments 382,699, 1.6 per cent below '56; first half 2,503,966, 9.8 per cent below '56.

RADIO (Including Automobile Receivers) — June shipments 765,719, 4.1 per cent below '56; first half 3,436,428, 5.1 per cent over '56.

COMPRESSOR BODIES (Including Automobile Units) — Shipments for May 447,373; January-May inclusive 2,366,273, 1.0 per cent over '56.

STEEL SHIPPING BARRELS & DRUMS — June shipments 3,026,000, 21 per cent below '56; First half 18,111,132, 9.5 per cent below '56.

STEEL PAILS — June shipments 6,949,000, 14 per cent below '56; first half 38,258,173, 8.1 per cent below '56.

Sources for this information: Gas Appliance Manufacturers Association, National Electrical Manufacturers Association, American Home Laundry Manufacturers Association, Vacuum Cleaner Manufacturers Association, National Association of Furniture Manufacturers, Electronic Industries Association, and Air-Conditioning and Refrigeration Institute, U.S. Dept. of Commerce.

*Note: During 1956, combination washer-dryers were reported once as an automatic washer and once as an electric or gas dryer. The 1957 per cent of change from 1956 on this basis is: Total Home Laundry Appliances down 16 per cent; Total Washers down 17 per cent; Automatic and Semi-Automatic Washers down 13 per cent; Total Dryers down 11 per cent.



ARMY REPORTS ON HEAT RESISTANT PAINTS

Excellent resistance to the high temperature of a blast flame is reported for two of several heat-resistant paints tested by the Army. A report of the research has just been released to industry through the Office of Technical Services, U. S. Department of Commerce.

A zinc dust pigmented dibutyl titanate resin type paint displayed superior resistance to a short blast of flame similar to that produced during rocket firing. Resistance of an aluminum pigmented silicone resin type was also excellent. The paints were coated on stainless steel panels and baked. For the tests, the panels were passed through the blast flame at a speed of one inch per ten seconds.

GAS — "UNLIMITED HORIZON" FOR PACIFIC MANUFACTURERS

Paul H. Hammond, vice president of Holly-General Company, Pasadena, was selected to head the Gas Appliance Manufacturers, section of the Pacific Coast Gas Association, for the second consecutive year.

Hammond announced the appointment of J. E. Kern, Los Angeles, as director of manufacturer programs of the PCGA. Kern will direct an expanded manufacturers' promotional program on the West Coast designed to stimulate gas appliance sales. Kern, for the past 10 years, has been assistant managing director of the PCGA.

The manufacturers' group includes 147 companies, of which 96 have their manufacturing facilities in California, Oregon and Washington. Its purpose includes upgrading gas appliance performance and installation standards, and sponsorship of industry-betterment activities.

Reporting on western gas appliance

manufacturing affairs, Hammond said that the heavy population growth in the western states, combined with the opening up of the Pacific northwest to natural gas during the past year, means "a virtually unlimited horizon for Pacific coast manufacturers of natural gas equipment".

PACKAGED AIR CONDITIONERS SELL IN QUANTITY

A Mansfield, Louisiana, refrigeration company has received the contract for air conditioning 24 buildings at Fort Polk. Represented as one of the largest air conditioning jobs ever contracted in the state, the installation will consist of 69 Chrysler Airtemp "packaged" air conditioners, plus a number of room air conditioners. Thirty of the "packaged" conditioners will be 8-ton models; 39 will be 5-ton versions.

WHIRLPOOL 6 MONTHS SALES UP

The Whirlpool Corporation has announced that net sales and other income for the six months ended June 30, 1957 totalled \$211,317,126, compared with \$182,164,754 for the first six months of 1956. This is a 16% increase of dollar sales for the first half of this year. Net earnings were \$6,148,080, equal to 95 cents per common share after provision for preferred dividends. This compares with \$6,526,255, and \$1.01 per common share, for the same period of 1956.

The unit sales of Whirlpool Corporation products have increased by 9% as against an appliance industry decline in unit sales of about 13% for the first half of 1957.

COLUMBIA STEEL EQUIPMENT ANNOUNCES PLANT EXPANSION

Columbia Steel Equipment Co., Inc., recently acquired as a wholly-owned subsidiary by Standard Pressed Steel Co., Jenkintown, has announced plans for a 53,000 square foot addition to its Fort Washington, Pa. plant.

The new addition will give Columbia, a producer of steel office furniture, a total of 150,000 square feet of manufacturing and office space in Fort Washington Industrial Park.

MAYTAG HIRES 150 NEW EMPLOYEES

Effective last August 12 all Maytag personnel laid off in production cut-backs earlier this year had been given the opportunity to return to work and an additional 150 new employees were added to the payroll, according to E. F. Scoutten, vice-president in charge of personnel for the Maytag company.

SAYRE SEES SALES BATTLE IN HOME LAUNDRY APPLIANCES

More than 42 per cent of 1957's total automatic washer sale — some 1,500,000 units — will be achieved during the last four months, according to Judson S. Sayre, president of Norge Division, Borg-Warner Corporation.

Volume of gas and electric automatic clothes dryers will account for 52 per cent of the annual dryer total in the same period, he predicts.

"The appliance industry is girding itself for the most massive home laundry marketing battle since the end of World War II. These figures may well be surpassed as the industry fights uphill to reach 1956 home laundry unit sales totals — 3,500,000 automatic washers and 1,450,000 automatic clothes dryers," Sayre noted.

He predicted that the industry would return to hard-selling methods in a "sales-type crusade" during September, October, November and December.

WESTINGHOUSE FIRST HALF NET EQUALS \$1.77 PER SHARE

Net income of the Westinghouse Electric Corporation for the first six months of 1957 was \$30,615,000, equal to \$1.77 a common share, Chairman and President Gwilym A. Price has reported. Sales billed for the period totaled \$982,939,000, a record for any first half-year.

LANDERS BUYS EASTERN METAL

The purchase of the land, buildings, and equipment of the Fort Smith, Arkansas plant of Eastern Metal Products Corporation of Tuckahoe, N. Y. by Landers, Frary & Clark, New Britain, Connecticut was announced by Arnold Troy and Bret C. Neece, presidents of the respective companies.

The report states that the Fort Smith facilities, which are less than two years old, represent one of the most modern manufacturing plants for electric housewares products in the country. The plant is located on a tract of 20 acres, on the outskirts of the city, and provides ample room for future expansion, Landers officials indicated.

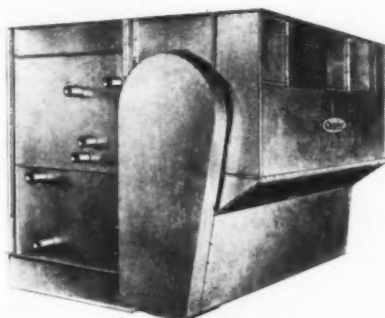
Eastern Metal Products Corporation has been manufacturing its line of electrical appliances at the Arkansas plant for the past 18 months. Landers is to announce later its plans for future manufacture of certain appliance and housewares products of the parent company or its subsidiaries, according to Mr. Neece.

The direct management of the Fort Smith facilities will continue under

Edward Bowman. William E. Gundelfinger, President of The Dazey Corporation, St. Louis, Missouri, and in charge of Landers' southern and western operations, will have general supervision of the new acquisition.

CARRIER INTRODUCES TWO NEW WATER-SAVING CONDENSERS

Two new condensers to beat water supply problems in larger air conditioning and refrigeration systems have been developed by Carrier Corporation, it was announced recently by Charles V. Fenn, vice president, Machinery and Systems Division.



The new models use evaporation of water or passage of air over condensing coils to remove heat from refrigerant. They can be applied to eliminate a cooling tower and costly condenser water piping in many "built-up" central systems and are designed to offer more compact installation and lower operating costs.

NORGE RELOCATES NATIONAL SERVICE STAFF IN CHICAGO

The relocation of appliance national service headquarters from Muskegon, Mich., to Chicago was announced recently by Norge Division, Borg-Warner Corporation.

National service director Elmer Fenton said his staff and product specialists will have their offices in 2,300 square feet of additional Norge floor space in the company's national headquarters at the Merchandise Mart. These men direct Norge national home appliance service activity.

CHRYSLER AIRTEMP ANNOUNCES SALES DIVISION CHANGES

Major organizational changes within the sales division of Chrysler Airtemp were announced by J. F. Knoff, vice president in charge of sales.

"In the interest of obtaining more precise control of all sales activities at every marketing level, to streamline and thereby strengthen the company's com-

petitive position, a number of organizational changes are being made at both the home office and field level", Knoff stated.

Knoff then outlined the following moves which will have become effective September 1, 1957. Under the direction of the sales vice president Airtemp's home office sales management group will consist of: T. B. Hollencamp, Director of National Service; M. T. Bard, Director of Branch Operations; R. B. Stotz, Director of Airtemp Construction Division; Sydney Anderson, Jr., Director of Zone Operations; A. J. Schiffmann, Director of National Accounts & Government sales; M. B. Smith, Director of Sales Planning; J. A. Clarke, Manager—Dealer Development Commercial-Residential Air Conditioning & Heating; H. A. Dillon, Manager—Dealer Development Room Air Conditioners; and J. C. Davidson, Manager—Technical Services.

MAYTAG FORMS NEW UTILITY RELATIONS DEPARTMENT

A newly-created department in the Maytag marketing division, designed to coordinate relationships with utilities is headed by B. B. Turner, who has been named manager of utility relations. Turner will serve as liaison between the Maytag company and utility companies across the nation.

Turner formerly was range sales manager for Maytag. Before joining the company in that capacity in 1945, he had been sales manager for the Globe-American Corp., Kokomo, Ind., for 12 years.

HEINTZ MFG. TO BECOME KELSEY-HAYES DIVISION

Kelsey-Hayes Company of Detroit, one of the nation's largest automotive suppliers and a major producer in the aviation and appliance fields and in other basic industries, has announced approval by the board of directors of Kelsey-Hayes and the board of directors of Heintz Manufacturing Company of Philadelphia of agreements under which the Philadelphia metalworking plant will be operated as a division of Kelsey-Hayes effective September 30, 1957.

Perry Williams, president of Kelsey-Hayes, and Charles B. Grace, chairman of the Heintz board, reported that the present Heintz management will continue to operate the new Kelsey-Hayes division and that plans call for installing extensive new production facilities in the Philadelphia plant to serve eastern customers.

MARSHALL & WELLS, AIR ENGINEERING MERGE

Two well-known Michigan firms who represent the nation's leading manufacturers of air moving equipment; air filter, dust control, heating and ventilating products; and steam heating specialties, have consolidated. Marshall & Wells Company, headed by Robert L. Wells, Grand Rapids, and Air Engineering Company, Kalamazoo, headed by Frank K. Platt, have consolidated their operations, with Air Engineering Company emerging as the principal firm.

The main office for the new organization will be 521 South Burdick Street, Kalamazoo, Mich., with branches in Grand Rapids, Mich., and South Bend, Ind. Personnel of both firms will remain intact.

AVCO ENTERS ARCHITECTURAL PORCELAIN PANEL FIELD

Avco Manufacturing Corporation, through its American Kitchens Division is now expanding its diversified activities into the manufacture and sale of architectural porcelain enamel service stations, according to Curry W. Stroup, general manager of the division and vice president of Avco.



Avco's American Kitchens Division is entering the prefabricated service station business with the firm belief they have an excellent product that will meet a growing need in the oil industry in the United States. Oil companies plan to erect a minimum of some 28,000 service stations of all types during the next five years; of these approximately 10% will be prefabricated according to present planning, disclosed by a recent survey. At the same time, there are only two or three manufacturers of architectural porcelain enamel who are offering a complete packaged service station.

AMERICAN CAN VP TO KEYNOTE PAINT FEDERATION MEETING

Dr. Roger H. Lueck, vice-president in charge of the Research and Technical department of American Can Company, will give the Keynote address at the 35th Annual Meeting of the Federation of Paint and Varnish Production Clubs at the Bellevue-Stratford Hotel in Philadelphia, October 30 through November 2, 1957, it is announced.

Although in the container field, Dr. Lueck's research work since joining American Can in 1922 has kept him in close touch with the paint industry through the development of organic coatings for metal.

For his contributions to tin conservation, Dr. Lueck was awarded an Honorary Degree of Doctor of Science from his alma mater, Carroll College.

ALUMINUM WINDOW BUILDERS SCHEDULE THREE MEETINGS

The Aluminum Window Manufacturers' Association has announced the dates and locations of its regular Fall, Winter, and Spring meetings.

John P. Jansson, AIA, executive vice president, reported that the Fall meeting will be held at the Waldorf-Astoria Hotel, New York, October 15-17. The Winter meeting is scheduled for the

Hotel Deauville, Miami Beach, January 7-9. The Spring meeting is set to be held at the Edgewater Beach Hotel, Chicago, April 15-17.

Norman Collyer, president of F. H. Sparks Company, Inc., New York window erectors, will discuss the erection of Aluminum curtain walls at the October meeting, and Richard N. Jones, advertising director of House & Home will discuss "How to Sell the Home Building Market in 1958".

BETTINGER EARNINGS UP

The Bettinger Corp., Waltham, Mass., had net income of \$47,045 in the six months ended June 30, 1957, compared with \$46,013 in the comparable period of 1956, it has been reported by Robert A. Weaver, Jr., president. Bettinger is a leading producer of ceramic-on-steel products.

TRANE SALES, PROFIT INCREASE FOR 1ST HALF

New first half record sales and net profits were announced recently by The Trane Company, manufacturers of air conditioning, heating, ventilating, and special heat transfer equipment.

For the first half of this year, Trane reported consolidated sales of \$39,762,334, an 8-per cent increase over 1956

figures of \$36,849,887. Net profit was up moderately at \$2,640,883 for 1957 as compared with \$2,573,872 for the same period in 1956.

10TH ARI EXPOSITION SET FOR CHICAGO AMPHITHEATRE

Many of the newest developments in the art of air-conditioning and refrigeration — from 1958 designs of end products to the latest refinements in some of the unseen, but vitally essential, parts in cooling systems — will be seen at the 10th Exposition of the Air-Conditioning and Refrigeration Industry November 18-21, in Chicago's International Amphitheatre, it was promised by George E. Mills, show director.

"We have not only a wider variety of exhibits this year," Mills said, "we have in addition the promise that the late models and new developments will draw a greater number of potential buyers and users than ever before. We have received many inquiries from distributors, architects, engineers, builders, and contractors in all parts of the country, indicating that they plan to be in Chicago for the event."

"Space sales have now almost reached the level of the Ninth Exposition, held in Atlantic City in 1955, and the show is still months away," he added.

The FOAMING ETCH BLUES

Quick, Joe, dump some more solution from this etching tank! It's foaming so much it's going up the stack and spraying the cars outside.

It's the high concentration of etchant and the high temperature you have to use in your tanks that causes this terrific foaming. Pennsalt Aluminum Etchant 16 will let you operate twenty degrees cooler, and you'll need only half the concentration you're using now.

But remember, Steve, we can't afford to stain or streak these extrusions.

Don't worry about that, Ernie. AE-16® built its reputation on a fine satin etch—and no scale in the tanks, either! Let me send you a drum tomorrow.

MAYTAG REORGANIZES INDUSTRIAL ENGINEERING

Several changes in organization and personnel of the Maytag company's industrial engineering department have been made to provide more effective industrial engineering service to the manufacturing division according to an announcement by J. F. Biggane, manager of industrial engineering.

Operational planning groups have been organized under the direction of R. L. Burdick and Vern Matson to assist the manufacturing division in the use of industrial engineering techniques for planning, developing and installing the best manufacturing operations.

An administrative unit has been organized under the direction of L. H. Oster, administrative engineer. The duties of this unit are to analyze, evaluate and increase the effectiveness of industrial engineering activities and to introduce new tools and techniques such as methods-time-measurement and mathematical programming.

The manufacturing expense reduction activities, formerly handled by coordinators of expense reduction at both plants, have been assumed by Wayne Creagan, who has been promoted to supervisor of work simplification and expense reduction.

YOUNGSTOWN KITCHENS DIV. BUILDING NEW WAREHOUSE

Construction is underway on a 51,000-square foot warehouse at the American-Standard Youngstown Kitchens Division main plant in Salem, O., C. D. Alderman, Division president, announces.

The new building will be used for storing and shipping porcelain-on-steel bathtubs being manufactured for the corporation's Plumbing and Heating Div.

Cost of the project is reported as approximately \$600,000, including removal of two existing buildings and other similar work, and conveyors and other materials handling equipment for the warehouse.

PORCELAIN ENAMEL ON ALUMINUM EXPECTED TO EXPAND 50% IN 1957

The market for porcelain enamel on aluminum is expected to expand from 3.5 million square feet in 1956 to 5.2 million square feet in 1957, according to findings of the Porcelain Enamel Institute's Aluminum division at their Mid-Year meeting in Cincinnati, Ohio on June 25, 1957.

The Commercial Research Committee

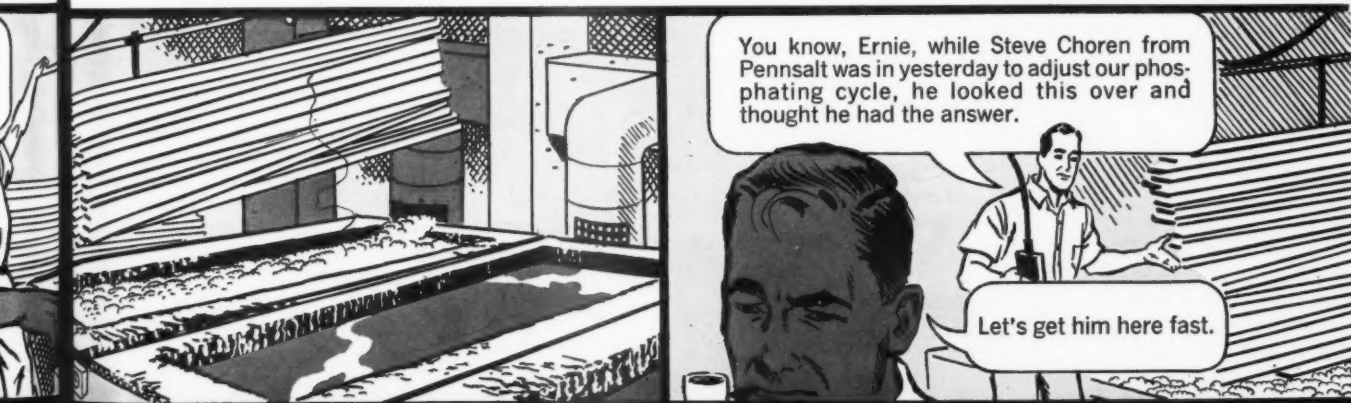
of the Division found that the building industry was the greatest single market for porcelain enamel on aluminum in 1956 with 2.4 million square feet being used predominantly for commercial construction. Much of the market for porcelain enamel on aluminum includes a wide variety of applications as signs, small appliances, transportation, cooking utensils and military uses.

The total market for porcelain enamel on aluminum is expected to increase 500% to 23 million square feet by 1961. By the forecast date of 1961 the Committee predicts that porcelain enamel on aluminum will have penetrated extensively into the automotive industry. Appliances, household equipment, and utensils are predicted to increase 600 per cent from 0.5 million square feet to 3.1 million square feet from 1957 to 1961.

FLEXIBLE TUBING ELECTED ASSOCIATE MEMBER AHLMA

Flexible Tubing Corporation, Guilford, Conn., has been elected an Associate Member of the American Home Laundry Manufacturers' Association, Guenther Baumgart, executive director, announced recently.

Joseph H. Dendy will serve as representative to AHLMA.



A MONTH LATER...

Well, Ernie, how did you make out with the Pennsalt etchant?

Fine, Steve! No more of that annoying foam, no more scale problem in the tanks, and we're getting a fast, clean etch with Pennsalt AE-16. Thanks for pulling me out of a tight spot.

No matter what the metal or the problem, take advantage of Pennsalt's wealth of know-how in metalworking chemistry. Call your Pennsalt salesman or send the coupon to get "A BETTER START FOR YOUR FINISH."

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NEWS about Suppliers

SPEND MILLION AT UW FOR PAINT RESEARCH AND DEVELOPMENT

More than one million dollars was expended by United Wallpaper, Inc., Chicago, for research and development on new products during the fiscal year.

During the year, the first since the company's reorganization and acquisition of Sears, Roebuck and Co. paint and wallpaper facilities, the Central Paint Research Laboratories conducted extensive basic research into resins and coatings for industrial finishes, and exercised quality control over the company's nine separate divisions.

The over-all sales picture of 38 million dollars, revealed by the report, indicated that the sharpest sales increase was registered in the industrial paint division. Sales in this division were 25 per cent over a similar 1956 period.

NEW PLANT DIVISION FOR DU-WEL METAL PRODUCTS

Du-Wel Metal Products Company of Bangor, Michigan has announced the plant for their new plating and finishing division, known as the Du-Wel Decorative Company, will be in full operation in October. This new division will be devoted exclusively to plating and painting zinc die castings.

The entire plant has been set up on as completely an automatic basis as possible to keep production costs low. The basic set up of the plant is to meet specifications for appliance use and indoor automotive applications. The Company plans to add an additional automatic line for outside specifications at a later date. The equipment is designed to handle extremely small castings up to parts forty-two inches long.

W. R. TUTTLE MEMORIAL GOLF OUTING

Tuttle Electric Products Incorporated, Kirkland, Illinois, sponsored a W. R. Tuttle Memorial golf outing at Bel-Mar Country Club, Belvidere, Illinois on Friday, August 23. Key executives from the electric appliance industry were invited to participate in the memorial dedicated to the late W. R. Tuttle, former executive with Tuttle & Kift, Chicago manufacturers. Before T & K

was formed, both Mr. Tuttle and Mr. Kift were engineers with Hotpoint.

D. V. Tuttle, President of Tuttle Electric Products, Inc., is a brother of the late Mr. Tuttle to whom the outing was dedicated. Other executives of the sponsoring company who welcomed the guests were W. R. "Doc" Seeley, vice president and director of sales, and A. W. Hackman, executive vice president.



Among those in attendance at the Tuttle Memorial Outing were, left to right: F. H. McCormick, who retired September 1 as assistant chief engineer at Frigidaire, W. R. Seeley, vice president and director of sales at Tuttle Electric, John C. Sharp, president of Hotpoint Company, and H. J. Berman, president of Consolidated Industries, Inc. The three guests in this group are "oldtimers" in the electric appliance business.

REYNOLDS TO STRENGTHEN FOREIGN OPERATIONS

W. G. Reynolds, vice president and director of Reynolds Metals Company, has been named president of Reynolds International, Inc., in a move by the aluminum firm to strengthen its overseas operations.

The announcement that the former head of the company's Parts Division would take over leadership of all Reynolds manufacturing and sales activities outside the United States was made by R. S. Reynolds, Jr., president of Reynolds Metals.

"W. G. Reynolds has been elected president of Reynolds International," it was announced, "as part of a program to intensify Reynolds activities in expanding market areas throughout the world. He will also be responsible for Reynolds exports from the United States."

Reynolds International has two plants in Columbia, and one each in Canada, the Philippines and Mexico. Two additional units are under construction in Cuba.

O'BRIEN CORP. RETAINS PROFESSORS IN UNIQUE PLAN

A unique plan of cooperation between business and education has been successfully pioneered by the University of Notre Dame and a nationwide paint manufacturing company called the Business Advisory Council Plan. It has been tested for the past eight months by the O'Brien Corp., a nationwide paint manufacturer with headquarters in South Bend, Ind., whose president Jerome J. Crowley, Jr. suggested the idea to the University of Notre Dame.

The O'Brien Corp. selected five professors from the fields with which it is most concerned and placed them on an annual retainer which directly augments their salaries from the University.

200 TO ATTEND M-H AUTOMATION SCHOOL

School bells are ringing not only for the nation's small fry but for grown-ups whose formal education has ended.

A school which started in September and is continuing through the end of 1957 will have nearly 200 engineers and technicians enrolled in classes on industrial control instruments at the Instrumentation Education Center conducted by Minneapolis-Honeywell's Industrial Division, Philadelphia, M. J. Ladden, director, reports.

The students represent 65 U.S. industrial firms and 14 government agencies

and 14 foreign companies in four countries. About 70 per cent are customer employees. Other enrollees are the Industrial Division's own sales and service personnel.

Curriculum for the tuition-free classes, which run from two to 13 weeks, includes courses in pyrometry, electric potentiometers, pneumatic control and transmission, flow meters, thermometers and pressure gauges. The center, opened in 1935, has more than 5,000 "graduates."

ULTRASONIC VENTURE DEBUTS

Paul Martin Platzman, New York industrialist and a specialist in ultrasonics, has announced the formation of a new company in the ultrasonic industry. The new organization, with headquarters in Mineola, N. Y., will be in operation by mid-September, it is stated. Several of the ultrasonic industry's outstanding generator and transducer design and applications engineers are said to have been recruited for key positions.

According to Mr. Platzman, the objective of the new venture will be to provide attractively priced ultrasonic cleaning machines and metal working equipment which will be intensively marketed and volume produced so that American industry may readily acquire these "amazingly-useful tools" at minimum investment.

CLARK CONTROLLER COMPANY OPENS SAN FRANCISCO OFFICE

A district sales office to serve the San Francisco area has been opened at 122 Second Avenue, San Mateo, Calif., by the Clark Controller Company, Cleveland. Clark Controller manufactures standard and specially-engineered electric control devices and systems. The new office is headed by David J. Belock, who previously was an application engineer in the company's Pittsburgh District Office.

OLIN MATHIESON ALUMINUM OPENS 7 NEW SALES OFFICES

As part of a program to organize a nationwide sales set-up prior to the beginning of large-scale production of Olin Aluminum in 1958, the Aluminum Division of Olin Mathieson Chemical Corporation today announced plans for the opening of seven new sales offices.

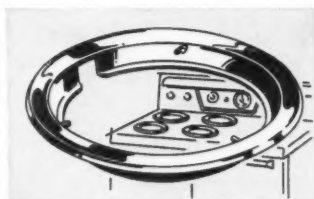
The seven offices will be located in Chicago, Detroit, Cincinnati, Philadelphia, Dallas, Houston and Memphis.

Regional sales managers for the new offices are as follows: John M. Welch—



...with PYRAMID RINGS!

Roll-formed from endless spirals, Pyramid rings cut costs by eliminating waste, yet give you the utmost in sparkling beauty, precision and strength. Choose from an almost unlimited variety of sizes and shapes—in-the-round like these examples, or square or straight—to solve any design problem. When it comes to metal mouldings, come to Pyramid—specialists in roll-formed mouldings for 30 years!

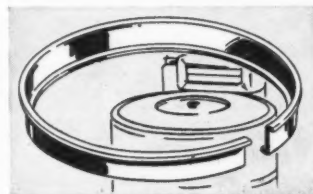
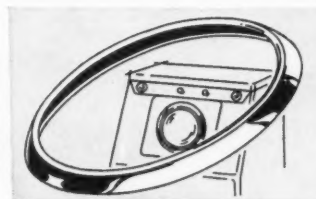


trim!

The trim, sanitary look of gleaming stainless steel burner rings lends visible sales appeal to quality ranges—gas, electric or built-ins.

tailored!

Fabricated with painstaking precision for an exact fit to any opening, Pyramid roll-formed bezels "dress up" today's best-selling appliances.



tough!

Rugged structural rings, designed for heavy duty, like this girder-strong washer component, are spiral roll-formed at low cost.

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Chicago — *Fred H. Edgar* — Detroit; *Forrest F. Tiffany* — Cincinnati; *A. F. Meyers* — Philadelphia; *W. P. Liljestrom* — Dallas; *James H. Wright* — Houston; and *R. B. Polonus* — Memphis.

Aluminum is currently being fabricated at four Olin Mathieson plants located at Chattanooga, Tenn.; East Alton, Ill.; Gulfport, Miss.; and Riverside, Calif. Start-up of production next year at a huge fabrication plant now under construction in the Ohio River Valley will make Olin Mathieson one of the nation's four major aluminum fabricators.

The primary aluminum will be produced by Ormet Corporation. Ownership of Ormet is shared jointly by Olin Mathieson and Revere Copper and Brass, Incorporated. The role of Ormet is to produce 180,000 tons a year of primary aluminum. Olin Mathieson will receive 120,000 tons and Revere 60,000.

Ormet is building an alumina plant on the Mississippi River at Burnside, La., and a reduction plant adjacent to Olin Mathieson's rolling mill at Omaha, O. The alumina plant will be in production early in 1958. Ormet's reduction plant will start initial production by the end of this year and will be in full production by the middle of 1958.

STOKES WILL REPRESENT

PATTERSON KELLEY ABROAD

Export sales of blending, mixing, and pilot plant equipment for The Patterson-Kelley Company of East Stroudsburg, Pa., are now being administered by the International Division of F. J. Stokes Corporation, Philadelphia, according to A. A. Hutchings, Stokes' vice-president in charge of sales.

BOSTITCH COMPLETES MOVE

TO NEW \$6,000,000 PLANT

Bostitch, Inc., has moved to a new \$6,000,000 factory and headquarters in East Greenwich, R. I., it is announced by Emmet G. Gardner, president. The need for greatly expanded facilities for the manufacture of staples and stapling equipment brought about the move from its Westerly, R. I. factory, where the company has headquartered since 1946.

The East Greenwich plant, said to be the largest one-story factory in New England, measures 440 x 960 feet on a 34-acre site and is planned so that it can be expanded in three directions to provide for future growth. Some products are also manufactured in Canadian and Puerto Rican plants.

NEW PERMACEL TAPE INDUSTRIAL ADHESIVES DEPT.

The formation of an Industrial Adhesives Department by Permacel Tape Corporation, New Brunswick, N.J., has been announced by George C. Riegger, Permacel President. Riegger said that the new department will permit Permacel to expand in the increasingly important industrial adhesive market.

Director of the new department is John O. Green, who has been serving Permacel in various administrative capacities. Mr. Green is Assistant Secretary of the company and a member of the Board of Directors. He also is a Vice President of LePage's, Inc., a Permacel subsidiary, and has been in charge of the bulk and industrial sales of that company.

NEW QUARTERS FOR ACOUSTICA ASSOCIATES

Acoustica Associates, Inc., designers and manufacturers of ultrasonic cleaning units, ultrasonic soldering guns, liquid level sensors, and entire cleaning systems for industry, announced their move from Glenwood Landing to new and larger quarters at 26 Windsor Ave., Mineola, L. I. on September 1st, 1957. The expanded facilities are needed, the report states, to meet the increased demand for their products.

GE CONSOLIDATES WEST COAST CHEMICAL MATERIALS OPERATION

West Coast headquarters for GE's Chemical Materials Department have been moved from the former Los Angeles address (1052 West Sixth Street) to 1211 North Olive St. — P. O. Box #630, Anaheim, California, according to a recent report.

Headquarters for Glyptal alkyd resins and polyester resins, and manufacturing facilities have been consolidated at the new address, according to J. L. Galt, general manager of the west coast section of General Electric Company's chemical materials department.

DEVILBISS OPENS NEW ATLANTA DIRECT FACTORY BRANCH

A direct factory branch of The Devilbiss Company in Atlanta has moved to new and larger quarters at 1100 Northside Drive, N.W. The new brick building has nearly 12,000 square feet of floor space, virtually double the room in the previous building at 1318 Spring Street, N.W. the report states.

The continued industrial growth of Southeastern United States made necessary the expansion.

MORE SUPPLIER PERSONALS

Douglas O. Yoder, president of The Yoder Company, Cleveland manufacturer of metal processing equipment, has been elected a director of The Steel Improvement and Forge Company, Cleveland, it was announced recently by Charles H. Smith Jr., president. Steel Improvement is a manufacturer of standard and precision forgings for the aircraft, machinery, missile and other industries.

Cochrane Corporation, Philadelphia, manufacturers of water conditioning equipment, announces the election of *Joseph R. Denton* as vice president, New York District Sales. Denton was formerly associated with Calco Chemical Division of American Cyanamid Company, and thereafter spent several years in the New York office of Worthington Corporation as a sales engineer.

John A. Coe, president of The American Brass Company, has announced the appointments of *C. Russell Epley* as vice president; *H. Allison Buckbee* as sales manager, and *Robert H. Hill* as assistant sales manager of the company's Los Angeles Division, effective July 1. Epley has been serving as general manager while the new brass mill, now nearing completion at Paramount, California, is under construction.

Chicago Vitreous Corporation, 1425 South 55th Court, Cicero 50, Illinois, a leading manufacturer of porcelain enamel frits, has promoted *L. A. Johnson* to the position of manager, frit sales and service, and *L. J. Van Dolah* to the position of director of research, according to an announcement by A. S. Ault, vice president and general manager.

Johnson was formerly director of research and Van Dolah was in field service.

Johnson joined Chicago Vitreous in 1937, and Van Dolah came with the company in 1940.

JOHNSON

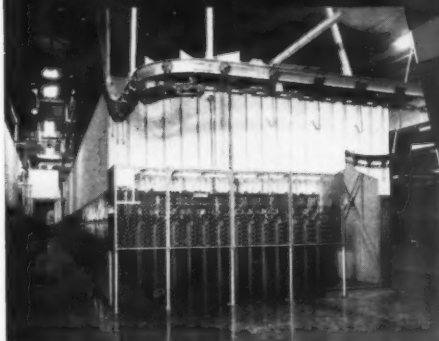


VAN DOLAH

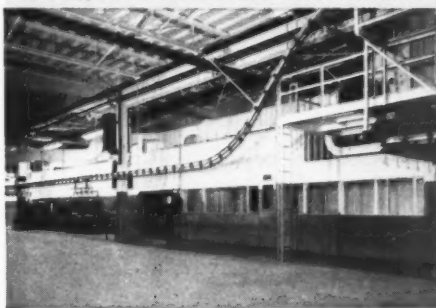


COMPLETE *Finishing* SYSTEMS

... for ENAMELS • LACQUER • PAINT • VARNISH



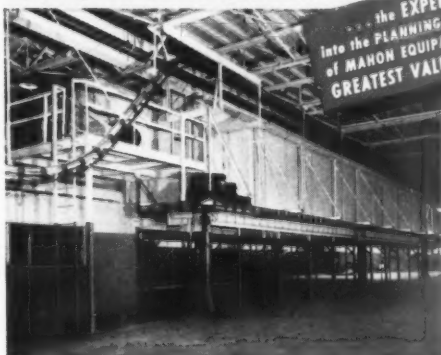
Exterior view of Ventilated Active Drip Zone. Clean, Filtered Air is Supplied to this enclosure. Fume-laden air is exhausted.



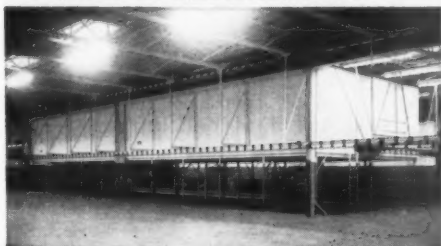
View showing glass in one side of Inactive Drip Zone where parts may be seen prior to entering Baking Oven.



View of Mahon Flow-Coating Equipment at Chrysler Corporation of Canada, Limited. This is part of a Complete Mahon Finishing System for Coating Black Enamel Parts.



View of Mahon 450° Enamel Baking Oven. Oven is built against ceiling trusses to provide parts storage space below.



Another view of the Enamel Baking Oven. Finish is baked for 20 minutes at 450° in this 80 Ft. x 24 Ft. Mahon Oven.

... the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!

Black Enamel Parts at CHRYSLER CORPORATION of CANADA, LIMITED, are FLOW-COATED in MAHON FINISHING SYSTEM!

In addition to the body finishing system at the Windsor plant of Chrysler Corporation of Canada, Limited, Mahon also installed a complete finishing system for black enamel parts. This is a Flow-Coating System which includes a Mahon Flow-Coating Machine, a Ventilated Active Drip Zone, a Ventilated Inactive Drip Zone, and a 450° Finish Baking Oven with storage space below. Two Enamel Mixing Tanks and a Solvent Tank are provided outside the enclosure. The recirculating unit is equipped to automatically maintain the enamel at a specific temperature in the Flow-Coating Chamber. This is a typical Mahon Flow-Coating System, complete in every detail—automatic from start to stop. If you have a finishing problem, or are contemplating new finishing equipment, you will find that Mahon engineers are better qualified to advise you on both methods and equipment requirements . . . and better qualified to do the all-important planning and engineering of equipment—which is the key to fine finishes at minimum cost. Whether your job is to be Flow-Coated, Dip-Coated, or Spray Painted either Manually or by Electrostatic Process, you will find that Mahon equipment will serve you better, because it is engineered better and built better for more economical operation over a longer period of time. Mahon will do a complete job for you on one contract—undivided responsibility for the entire system insures proper coordination and safeguards you against complications which can upset your production schedules. See Mahon's Insert in Sweet's Plant Engineering File, or write for Catalog A-657.

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OFFICES, LABORATORY AND PLANT
FRANKFORT, INDIANA



Porcelain enameling at Frigidaire of Canada

(Continued from Page 43)

post extending outward from the rotation axis. The post is inserted in the proper hole and pressed forward. The brush then removes a circle of dried coating exposing the right size circle of metal.

There are two reinforcing booths located after the drying ovens. Here touch up of any damaged areas is performed. One such area is where the piece touches the hanger. No correction is needed around the holes where hanger pins penetrate. Any stippling required is done in the reinforcing booths also. After a second dry-off, the parts are ready for firing.

Before entering the furnace, the dried coated parts are taken off one conveyor and transferred to the furnace conveyor. Here little attention is made to the angle at which the part is held. Straight up and down is the best. It is important that suspension be arranged so that the coating is disturbed as little as possible.

The two firing furnaces are U shaped. There are two pre-heat zones through which the temperature is built up to 1560°F which is reached at the bottom of the furnace U. Total time in the furnace goes from 15 to 20 minutes. Average conveyor speed is 16 feet per minute. The pre-heat zone takes up 3 minutes of this time and a similar period elapses after firing before leaving the furnace. There are air seals at both the mouth and exit of the furnaces, and right before the high temperature heating elements. All heating power is electric, with each furnace using 1250 K.W. Air bleed-off goes directly into the plant. Parts are cooled 15 to 20 minutes before finish is applied.

Correct fusion temperature inside the furnace is maintained by means of a thermocouple recorder. This is sent through for periodic test runs. It is of interest to note that the total weight of this instrument is about 700 pounds. Excess weight is taken up by the careful insulation to protect the instrument.

Cover coat application

After the ground coat has been inspected and found satisfactory, the parts are ready to be cover coated. There are two spray methods used. One of these is by manually operated spray gun. The other is on a lay-down horizontal conveyor on which the work is sprayed automatically. Some parts are dipped.

Cover coat application is followed by a dry-off period in the same type oven used with the ground coat. While most finishes are white, there are a number of pastel shades used, too. Average fired thickness is 10 to 12 mils.

There is more treatment needed after cover coating than after ground coating, since there are many places where only the ground coat must show. These areas are not masked. The dried cover coat is most easily removed by specially designed brushes before firing. This brushing is done in booths.

When the work has been fully prepared, it is removed to the firing furnace conveyor. In the furnace, the finish is subjected to a top temperature of 1540°F, with the firing time close to 20 minutes.

After inspection, these parts are conveyed to assembly or to temporary storage. Cardboard between piled pieces greatly reduces damage in storage. Production is kept to a maximum of only two days ahead of final assembly requirements. This prevents build-up of excessive inventory which can lead to scrapping during change of models.

Sometimes it is necessary to letter directions on appliance cases. This is done by silk screen and is subjected to the firing cycle with the finish coat.

Rejects and maintenance

It has been mentioned before that dirt rejects amount to less than 3 per cent of production. The nightly vacuum cleaning assists in making this possible. The plant is completely renovated four times a year. Preventive maintenance on the whole is very high. This results in maximum rejects for all causes of less than 15 per cent. Often the actual figure is less than 5 per cent, even though inspection standards are high.

If a part is bent in handling, the affected section is straightened by means of a rubber hammer and other equipment similar to that used in automobile body repair shops. Chips in the finish resulting from this or blemishes on the finish surface left from processing, are smoothed out by means of an abrasive stone. Previously, this was a hand operation, but now motor driven stones are to be used. After the blemishes have been removed, the area is refinished with a light feather coat, dried and fired. This same treatment is given to units damaged in shipment or dealer

storage, providing the coating thickness is not greater than 20 mils.

The spray guns used by Frigidaire are equipped with special tips, which withstand the spraying of the abrasive coating for six months to a year without excessive wear. Repair of all spray equipment is done by the company's own maintenance department.

Considerable study is being given to the reclaiming of overspray. Ground coat overspray is now reclaimed, and it is hoped that cover coat overspray will be recoverable, too. This is probably the most significant aspect of top quality plant cleanliness. Without unusual conditions in this regard, such recovery would be impractical.

We were once told of Frigidaire by a small manufacturer of vitreous enameled household washing machines. "You should see Frigidaire", he said. "They have the finest vitreous enameling plant in Canada. You'll find them real nice people to deal with, too."

We brought the matter up with R. J. Woxman, Works Manager of Frigidaire. "Why would this small manufacturer speak so highly of you," we asked, "when you are a strong competitor of his?"

"I really can't say," he replied, "except that we use any manufacturing advantage we might have in keeping everybody who deals with us satisfied. And today that's a problem!"

"Frankly," Woxman observed, "we hope this article may be helpful to both our suppliers and our competitors. The suppliers might be able to suggest better materials or methods to us. Perhaps our competitors might get some tips, too. This can do nothing but help in the making of better appliances, which leads only to greater public demand for them. As far as we are concerned, the demand can't be too great.

Frigidaire, it appears, is not only modern in its engineering, but is equally progressive in its business attitudes.

CORROSION FACTORS IN HOME LAUNDRY EQUIPMENT

A) Solution by alkali or hot water is accelerated by constant removal of film from the surface

B) Water condensate attack occurs when the condensate forms on a surface at relatively-high temperatures (150° to 212°F)

C) Abrasion is not encountered as the sole cause of corrosion, but is combined with alkali and hot water corrosion and surface film removal.

by E. E. Bryant p. 54 May, '57 MPM

Pomona Tile Mfg. Co. Ar



For technical information, please write:

LZP INDUSTRIAL CERAMICS CO. 275 Kalamath St., Denver 23, Colo.

National Sales Representatives for

COORS PORCELAIN COMPANY

Coors High Density Grinding Media and Liner Brick are made isoretically of special alumina ceramic, and fired at 2670°F to a specific gravity of 3.4. These products can help speed your mill production.

Arkansas City, Kansas

reduces
grinding
time

52%

and at the same time
increases glaze charges 10%

with *Coors* equipped mills!

"We have reduced our grinding time by roughly 52%, and at the same time have been able to increase the size of our glaze charges by about 10%.

"We now have two mills in use that are equipped with Coors High Density Lifter Bar Linings and Grinding Media. Our first Coors lining installation was made in September, 1955, in a 42" x 60" mill. The second installation was made in late 1956, in a 72" x 72" mill using a 1½" lifter bar shell lining with 2" head brick.

"The first of these two linings has in every way proved itself superior to conventional types of lining. There has to date been no maintenance or replacement cost in connection with this lining which has had 18

months service thus far. The high density grinding media shows extremely low weight loss, being roughly 0.1% of the total weight of balls used per charge. We have used other types of grinding media showing weight loss as high as 1% of the total weight of media used per glaze charge.

"The use of Coors High Density Mill Liners and Coors High Density Grinding Media has been a substantial step forward in improving quality and control, and in lowering the cost of the glaze preparation operation here in our plant."—James C. Grant, Plant Superintendent, Pomona Tile Manufacturing Co., Arkansas City, Kansas.



James C. Grant, left, plant superintendent, Pomona Tile Manufacturing Co., Arkansas City, Kansas, and Fred E. Tarrance, Jr., chief ceramic engineer, inspect the media charge in the 72" x 72" mill lined with Coors High Density Lifter Bar Brick, and charged with Coors High Density Grinding Media.

LZP Industrial Ceramics Co.
275 Kalamath St.
Denver 23, Colorado

Please send technical information and samples of
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Title.....

Company.....

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City..... State.....

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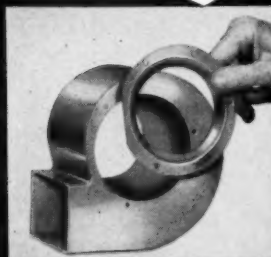
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for 3 3/4" wheel



MODEL 350

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- supplied with integral inlet flange or solid side plate on quantity orders
- low prices due to specially developed equipment for rapid mass production

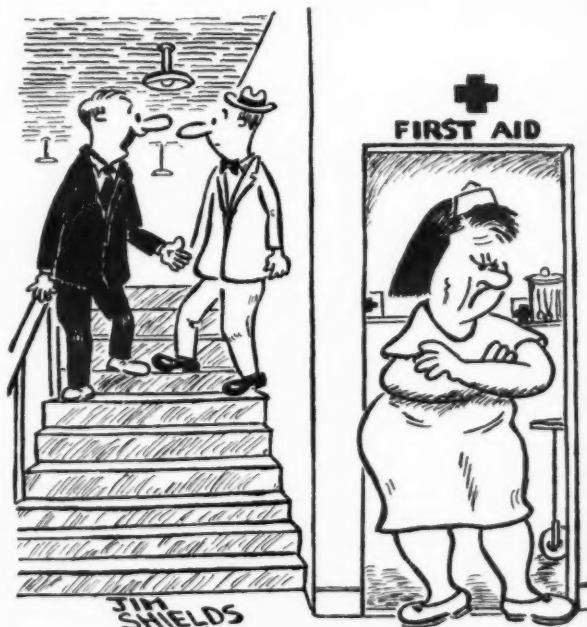
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Standard Blower Housings for Wheels from 3 3/4" to 9 1/2" dia.



"YOU'LL SEE WHY WE DON'T HAVE
MANY ACCIDENTS IN OUR PLANT"

"BOOMERANGS"

Reduced to a Minimum for

VICTORY



Damages on arrival cause "boomeranging" shipments! "Boomerangs" create loss of sales, time and confidence at your customers' level, and reduce your profits!

Victory Metal Mfg. Corp., Plymouth Meeting, Pa., eliminated hidden damage by shipping their commercial refrigerators in CHICAGO MILL containers!

Only Chicago Mill MAKES 'EM ALL — a complete line of containers for every shipping purpose!



FREE!

Illustrated catalog describing the variety of CHICAGO MILL Containers!



PALLET BOXES—Wire Bound



PALLET BOXES—Hinged Corner



Cleated Boxes



E-Z Pak Cleated Corrugated (Watkins type)



Wirebound Crates



Wirebound Boxes



Corrugated



Hinged Corner Crates or Boxes

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- ROCKMART, GEORGIA
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HOW *Inland* DESIGN LEADERSHIP SAVES YOU MONEY



● Inland designers joined with the engineers of this large appliance manufacturer* and created a corrugated shipping container for electric ranges to meet the special requirements of their high speed production line and modern warehousing methods.

One of the important *plus values* of the container they developed was its ability to fully protect the ranges—even when they travel *face down*. This revolutionary practice makes it possible to substantially increase the carload quantity of ranges by utilizing top space formerly wasted but paid for under minimum weight requirements. These additional ranges, occupying previously "left over" space, travel to their destination free.

Your Inland package engineer is a *corrugated shipping container specialist*. When your product packaging is entrusted to him, you can be sure you are getting the benefit of every possible packaging economy applicable to your product.

*Name on request.

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INLAND CONTAINER CORPORATION
INDIANAPOLIS 6, INDIANA

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MILLS: Macon, Georgia; Rome, Georgia. **PLANTS AND SALES OFFICES:** Indianapolis, Indiana; Middletown, Ohio; Milwaukee, Wisconsin; Evansville, Indiana; Detroit, Michigan; Macon, Georgia; Erie, Pennsylvania; Ashtabula, Ohio; Orlando, Florida; Rome, Georgia; Biglerville, Pennsylvania; Dallas, Texas.

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safe transit

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DANA CHASE PUBLICATIONS
York Street at Park Avenue
Elmhurst, Illinois

editorial voice of the national safe transit program

devoted to improving packaging methods and shipping and materials handling methods for the appliance and metal products manufacturing industries. This section contains plant experience information and industry advances for the use of all executives and plant men interested in improving packaging and shipping methods and in loss prevention. The section contains complete information on the national safe transit pre-shipment testing program for packaged finished products and detailed reports of divisions and sub-committees of the National Safe Transit Committee.

Federal specifications for packaging major household appliances

New interim Federal specification is based on National Safe Transit concept of pre-shipment testing

SUBSTANTIAL savings for both government and industry are predicted by the National Safe Transit Committee, as a result of the recent issuance of Interim Federal Specification PPP-P-0021 (navy-S&A). This performance type specification, covering "Packaging and Packing of Porcelain Enamel Products and Major Household Appliances," is based upon the National Safe Transit Program's concept of pre-shipment testing, according to John C. Oliver, secretary for the National Safe Transit Program.

Three important services of the new specification were stressed by Oliver. These are: (1) It will enable government agencies to take advantage of commercial packaging practices in their procurement of major appliances and other similar products. (2) Industry will be able to supply government contracts with products from regular packaging assembly lines, thus utilizing established commercial packaging techniques and standards rather than having to adopt special government requirement at added cost. (3) Companies will be provided with a minimum standard for fair, competitive bidding.

The new specification is the result of a careful and thorough study by both Government and industry representatives of an Interim Federal Specification issued in 1954. The National Safe Transit Committee served as Coordinator for this special cooperative project of government and industry. The revisions written into the new specification represent the efforts of both groups.

The scope of the specification within government levels of protection for shipment is set forth in the following statement from the specification.

- Level A.—Shipments intended for indeterminate storage and world wide distribution. (Although Level A shipments are referred to herein, this specification does not contain requirements for Level A shipments.)
- Level B.—Shipments intended for indefinite domestic storage or overseas shipment under known conditions.
- Level C.—Shipments intended for immediate use or those which will be kept in covered storage and issued from the Government Supply System to a domestic consumer not involving ocean going transportation.

R. F. Bisbee, general chairman of the National Safe Transit Committee, commenting on the project, said that the requirements for Level C shipments are identical to the pre-shipment test re-

quirements of the National Safe Transit Committee. Level B requirements are slightly more severe than the standard NST requirements. This phase of the work was based upon the experiences of more than twenty firms cooperating in the project who account for an estimated 70 per cent of major appliances production. "The Specification," he said, "requires performance type testing as set forth in the Safe Transit Test Procedures. The NST test procedures simulate actual transit conditions and enable a manufacturer to know prior to shipment whether or not his product is designed and packaged to reach its destination undamaged." Bisbee pointed out that the incorporation of the Test Procedures in the specification leaves the design and type of shipping container, the construction materials and methods, and the packing to the prudence and judgment of the manufacturer.

Single Copies of Interim Federal Specification PPP-P-0021 and the National Safe Transit Test Procedures are available without charge from the National Safe Transit Committee's offices at 1145 — 19th Street, N.W. Washington 6, D.C.



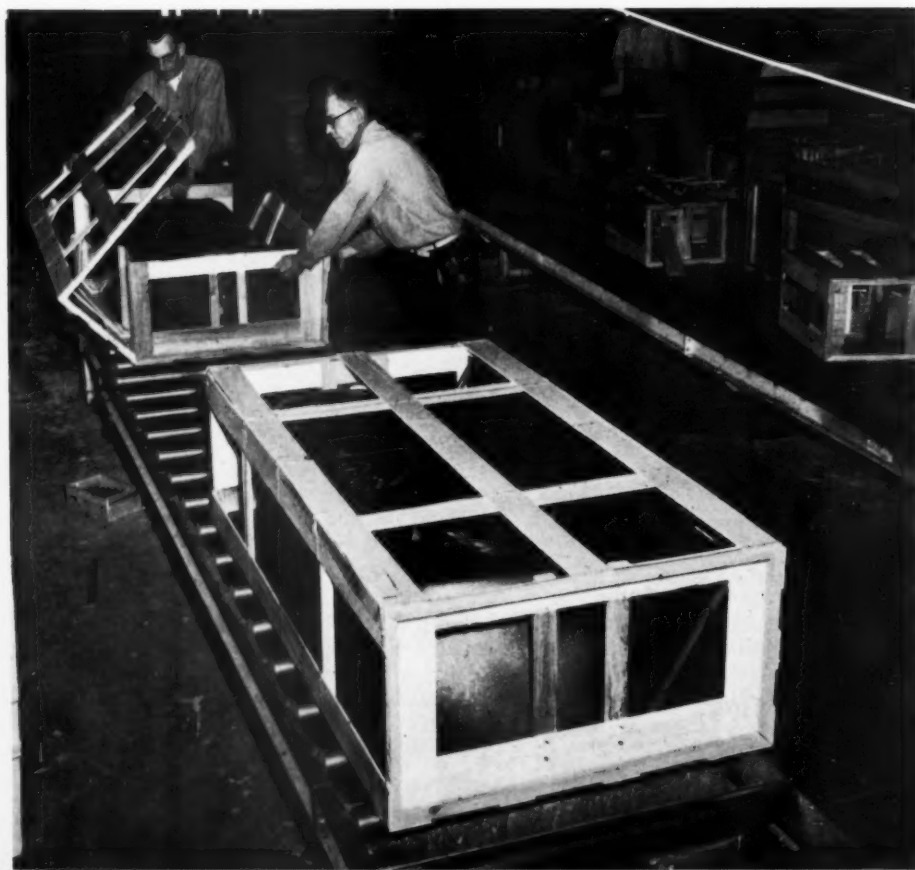
*Above: LEEDS and NORTHRUP — "Good packaging is not new to us, but with NST we get it more promptly than ever before, and at lower overall cost."
G. H. Straub, assistant to the manager, order control dept.*

NST in action

these photos show how members
saved money and gained satisfaction



Right: O. A. SUTTON — "Dealer acceptance of our products is greater when the shipping containers carry the NST label. They know this means the product will reach the customer in perfect condition." Al Bross, vice president, sales.



Left: BORG-WARNER — These packaged bathtubs have met Safe Transit test requirements. After crating, the Safe Transit label will be applied.

inction

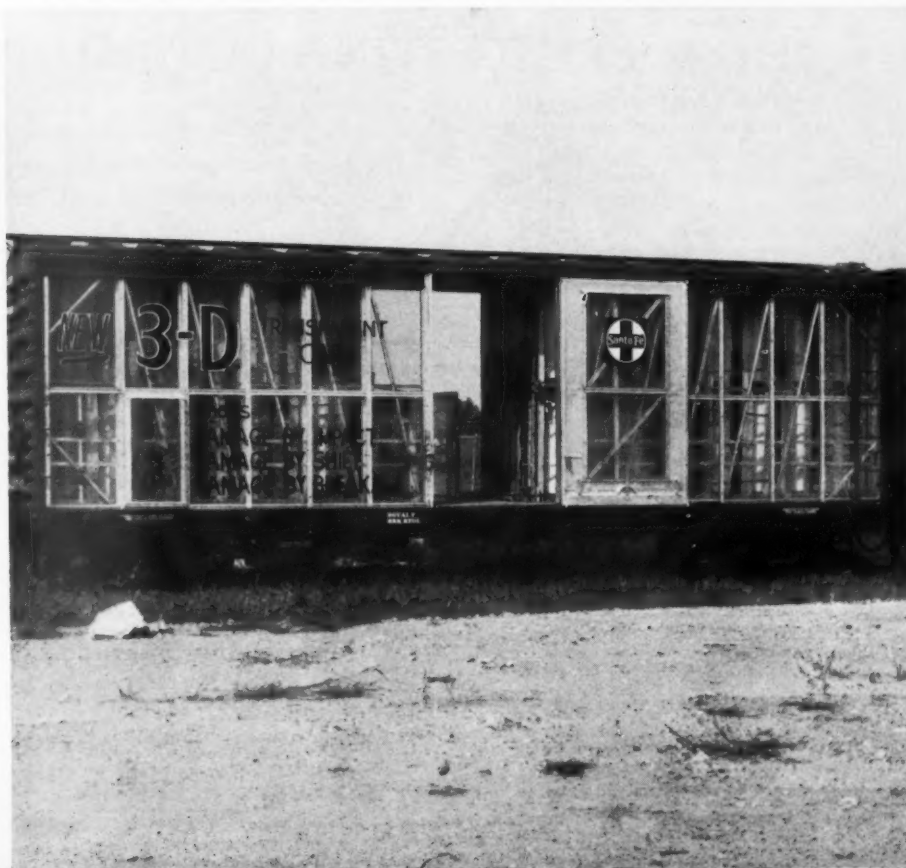
member companies have
satisfied customers

Left: WESTINGHOUSE ELECTRIC — "We have found that the National Safe Transit testing procedures provide a method of determining in advance the adequacy of both the product and the package to deliver safely at its destination, and to do this at the cheapest possible cost." R. B. Atkinson, packaging committee chairman.

Right: ALLIS-CHALMERS — "The National Safe Transit Program acts as a double check on both the packaging and the mechanical design of our transformers. Crate damage has been reduced, especially where reshipment from stock points is necessary, and where long distance hauling is involved." R. W. Beard, manager of sales.



Below: A. O. SMITH — "We find that NST carloading test procedures give a new insight into methods of obtaining shipability within the limits so very necessary to maintain good customer relations." A. N. Duncan, packaging engineer.





HOW PRE-TESTING CUTS SHIPPING DAMAGE



Your product packaged by Gaylord can take its first trip over the road of distribution inside our laboratories. As a member of the National Safe Transit Program, Gaylord conducts unsparing tests duplicating the actual hazards of shipment.

This is only one phase of Gaylord engineering research which helps reduce shipping losses in every major American industry.

Make sure your boxes are performance-proved before they get their travel orders. Call your near-by Gaylord engineer. He likes tough challenges.

CORRUGATED AND SOLID FIBRE BOXES • FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES • KRAFT BAGS AND SACKS

GAYLORD CONTAINER CORPORATION ★ ST. LOUIS

DIVISION OF CROWN ZELLERBACH CORPORATION

NST brings increased profits to participating manufacturers

THE National Safe Transit Program had its formal beginning in 1948 under the sponsorship of the Porcelain Enamel Institute. The Program's goal was to find a solution to the mounting problem of in-transit damages to packaged products.

Causes underlying shipping failure were found to be many and complex. Although the term "shipping damage" was widely used, factors other than those involved in actual transportation were proved to bear a heavy responsibility for failure. Poor packaging, weak product design, carelessness in manufacturing—these and others could be contributory causes.

A solution integrating all of these factors had to be found. The knowledge that certain transportation hazards do exist which cannot be completely eliminated had to be faced. Approaching the problem with this in mind, and striving for a prevention rather than a cure, attention was given to the development of tests which would simulate actual transit conditions and which would enable the manufacturer to know, prior to shipment, whether or not his packaged products were structurally capable of withstanding the shocks and stresses imposed under normal transit conditions.

After many months involving thousands of miles of test shipments to determine average conditions encountered by the packaged product in transit, Safe Transit test procedures were formulated. This test work was conducted in cooperation with the Association of American Railroads, American Trucking Associations, Inc., Railway Express, and Air Cargo, Inc. The tests faithfully reproduce the conditions encountered during transportation and handling, and serve as the basis for the National Safe Transit Program—a voluntary, cooperative, and non-profit movement by industry and carriers.

Benefits reported by certified companies

As the National Safe Transit Program has grown and still continues its expansion and acceptance throughout all of American industry, product manufacturers certified under the Program have reported many and varied benefits as a direct result of their participation in the Program.

Package engineers utilize the Program to effect reduced product losses in transit and reduced packaging costs.

The *Quality Control* department has a valuable tool for establishing a periodic pre-shipment test schedule facilitating the maintenance of the uniform quality of product and package.

Design engineers can pre-check new designs and construction features for "shipability" before recommending the new features for production.

The *Public Relations* department can effectively utilize the Safe Transit concept for improved carrier, distributor, and dealer relations. The Safe Transit participant is recognized as a manufacturer who has done his part to assure the safe delivery of his product.

The *Sales Department* can use the Program as a vital sales aid. The definite sales advantage is apparent when

customers can be shown that pre-shipment testing saves them the trouble and expense of handling damaged goods.

Thus, the NST Program is a valuable intrinsic tool in each of these departments. Yet, each department contributes only a component part to the overall goal—the production of the best possible product which can be sold at a fair competitive price with the maximum of profit to the manufacturer. This ultimate goal is the concern of *Top Management* and requires smooth teamwork and the best efforts of the various departments.

Manufacturers participating in the National Safe Transit Program are fully cognizant of the part the Program has played in increasing their overall profits. The following excerpts from letters received from certified companies report on the Program's value.

Company officials voice praise of NST program

Additional Profits

Over the years we have found many . . . benefits that have resulted from using . . . the (National Safe Transit) program, such as:

Engineering . . . now able to find weaknesses in design in our verification samples and correct them before production starts. The potential in the engineering field is tremendous.

Package design . . . we are able to determine without running test shipments if our product will withstand shipment; also, we are able to milk out the last drop of cost.

Quality Control . . . because of the many variables in materials and workmanship, we have found by running the preshipment tests daily we are able to make corrections on defects that would cause field troubles—before we build a huge inventory of products with repetitive defects.

We naturally feel that all of these benefits contribute not only to a better product, but to additional profit.

D. B. Fighter
WORKS MANAGER
WESTINGHOUSE ELECTRIC CORP.
MANSFIELD, OHIO

Solves serious problems

The National Safe Transit Program has been, and is, a great help to the appliance industry in that it has pinpointed the weaknesses in our programs to transfer a satisfactory product to the consumer. Through the standardization of pre-testing methods, publicity of the problems and cures, and promotion of better packaging and handling, the program has already gone a long way toward the solution of the many serious problems in that field. We heartily subscribe to the aims and purposes for which the program was organized. . . .

R. E. Moyer

ASSISTANT TO THE GENERAL MANAGER
MURRAY MANUFACTURING CO.
MURRAY, KY.

Many benefits

I thought you would be interested in knowing of the many benefits that we have obtained through the National Safe Transit Program in the Buffalo Works. . . . We make the medium size electric motors at this plant. Here are the benefits:

Cost Reduction: This Program has resulted in \$17,000 cost reduction so far

in 1956. In many of our items we were over-packaged and, through the use of this Program, we have not only made savings in dollars, but in time and material and, in many instances, lower transportation charges result from the reduction in container weight.

Tool for Engineering and Quality Control: We have been able to determine engineering defects prior to the product reaching the customer, thereby eliminating field charges and dissatisfied customers.

Tool for Manufacturing: Manufacturing areas benefit from quick and more economical methods in the use of this Program.

Traffic and sales department: Carriers respect the NST label and handle material more carefully, thus further reducing damage to our products. Our customers respect the NST label, as well; and our salesmen can use the NST label as an educational selling tool.

John E. Sacks

SUPERINTENDENT, SHIPPING,
RECEIVING & TRANSPORTATION
WESTINGHOUSE ELECTRIC CORP.
BUFFALO, N. Y.

33-1/3 percent saving

... We are happy to advise that through the National Safe Transit Program our packaged products have been tested and approved to meet all specifications of ... National Safe Transit. ... The fact that ... (the Safe Transit) label appears on our packaging has reduced damages considerably. ... We firmly believe that through the use of the NST label and their program we have effected a cost savings of at least thirty-three and one third percent.

A. A. Amoroso

HASKELL MFG. CO., INC.
PITTSBURGH, PA.

Time and money savings

I thought you would be interested in knowing of the benefits the Bryant Electric Company has found since the installation of our "Safe Transit" testing equipment. We had experienced serious difficulties in shipping (some) units ... and had changed packing methods several times without improving the results. When we were able to pre-test our packaging, we found the weak

points without waiting for field experience.

Our Engineering Dept. has also been very enthusiastic about the use of this equipment as they can make the test on models while still in the development stage. This has saved us both time and money as changes in both tools and dies can be made before field trouble occurs.

We are also using our equipment to test shipping cartons and packing procedure for our Plastic Dept. Prior to "Safe Transit Testing," cartons were pushed down a flight of steps and carton design was left to the salesmen, who many times were more interested in selling a carton than the safe arrival of merchandise. We now test all sample cartons before approving for stock. We feel that the use of the "Safe Transit Testing" will improve our customer relations as merchandise damaged and distorted in transit is of little value to a customer.

J. K. Adams

MANAGER OF MANUFACTURING
WIRING DEVICE DIVISION
THE BRYANT ELECTRIC CO.
BRIDGEPORT CONN.



FEATURING B-G
WRAP-AROUND CORNER

BIGELOW GARVEY

WRAP-AROUNDS

FOR FASTER PACKING
SAFER SHIPPING
HANDLING and STACKING



OPEN and CLOSED

B-G Containers ideal for tall, heavy items such as — Water Heaters... Hot Air Furnaces... Refrigerators, etc.

B-G Containers are economical in cost — individually engineered... pre-tested... quickly assembled.

B-G sales engineer will gladly assist in your shipping problems. Please contact and take advantage of our 30 years experience.



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Phone
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"All
manufacturing,
engineering
and quality
efforts are
in vain if
the product
reaches its
destination
in a damaged
condition."

\$30,000 saving

We have been associated with the National Safe Transit program for several years. The initial stages of our National Safe Transit work were largely concerned with reducing field transportation damage to an acceptable level. This was accomplished about two years ago. Since that time our National Safe Transit testing has had two objectives: first, as a tool of Quality Control, and second, as a part of our cost reduction program by testing shipping containers of lower cost. In the course of the last year we have effected a saving of about \$30,000.00 in our packaging.

W. C. Luton

SUPERINTENDENT
APPLIANCE QUALITY CONTROL
CANADIAN WESTINGHOUSE CO. LTD.
HAMILTON, ONTARIO, CANADA

FINANCING FIRM TO ATTEND NATIONAL METAL EXPOSITION

Executives of C.I.T. Corp., a large industrial financing firm, will be available at Booth 1741 at the 39th National Metal Exposition in Chicago's International Amphitheatre, Nov. 4-8, to answer inquiries on installment financing of metal working machinery and equipment.

Here's why **Whirlpool** uses International shipping containers



Special construction provides safe transit.

- Fast, easy packing assembly cuts down labor cost
- Dealers report refrigerators arrive factory-fresh in International's dust-proof containers
- Take less room—store better
- Tube and cap design enables lift truck to handle easily without pallets . . . provides grip for easier handling by the retailer
- Large clean surfaces allow product identification and advertising

If you have a problem in container design, write for full details of our custom design service.



Quick assembly speeds up packing operation.



Lift truck inserts the lifting flange under one side of cap, pulls up. Strong construction enables sure, fast lifting, close stacking without usual jostling.




International Paper company
CONTAINER DIVISION
220 East 42nd Street, New York 17, N. Y.



These Philco-Bendix Dup-
matic washer-dryers are
properly protected for safe
shipment through the use
of Watkins Containers.



The Finest Products Go In Watkins Containers

They are preferred because of:

1. Low Cost
2. Stacking Strength
3. 75% Assembled—Upon Receipt
4. Ease of Assembly
5. Easy Handling
6. Minimum Storage Space
7. Protection from Dust and Dirt

THESE COMPANIES BUILD WATKINS CONTAINERS



Custom Protection . . .

THE **WATKINS CONTAINER** MANUFACTURERS

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LOVE MFG. CO.
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ADVERTISERS' INDEX

Airless spray system

→ from Page 53

for exhaust systems; and adaptability to plastisols and other "difficult to spray" coatings.

Because of the high temperatures and pressures involved, an important design consideration was the hose used to carry hot, pressurized solvents from heating system to spray gun. When conventional hoses failed, the decision was made to install the steel jacketed fluorocarbon resin hose assembly. Following two years of trouble-free operation, engineers working with the airless system report that carrying hot solvents is no longer a problem.

The hose assembly consists of a specially compounded and extruded resin tube equipped with stainless steel jacket and three-piece steel couplings. The tube, which is inert to solvents in paint and lacquers, is tested for temperatures to 500° F and pressures to 3000 psi. The stainless steel jacket resists fatigue and provides a positive blow-off proof anchor for the couplings.

Materials at the gun are released through a selected nozzle, usually manufactured of synthetic sapphire or tungsten carbide, which provides the required flow rate and spray angle. The gun may be located as much as 100 feet from the pumping system.

REPRINTS AVAILABLE

SPECIFICATIONS FOR WHITE APPLIANCE FINISHES by Edward G. Bobalek, Professor of Chemical Engineering, Case Institute of Technology. Four pages—two color. Critical problems in testing discussed, procedures and pitfalls pointed out and explained in this report which is of interest to all organic finish users. 15¢ per copy.

FORMABILITY OF METALS by Lester F. Spencer, Consultant in Metallurgy. Sixteen pages—two color. Covers: basic characteristics of metals, the carbon steels, press operations and roll forming. 25¢ per copy.

A STUDY OF THE CHARACTERISTICS OF ANODIZED ALUMINUM ALLOYS by R. V. Vanden Berg, Aluminum Company of America. Six pages—black and white. Covers a wide variety of surface treatments available for aluminum, and the many finish characteristics. 25¢ per copy.

A REVIEW OF SURFACE TREATMENTS OF METAL by A. J. Tuckerman, Bradley Paint Company. Four pages black and white. Covers surface treatments prior to organic finishing, for ferrous and non-ferrous metals. 15¢ per copy.

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"I saw your ad in MPM"

BIG OR SMALL YOUR PRODUCT DELIVERED UNDAMAGED



The inherent strength of Wirebound containers is our most important asset—and your gain. For products packed in Wirebounds take the cross-country ride from manufacturer's shipping dock to consumer in relentless safety. Little chance here for time or money lost due to damage incurred enroute! That's because Wirebounds . . . designed to provide maximum protection . . . are constructed of rugged woods reinforced with strong steel wire in varied combinations to

produce resilient or rigid containers according to the need of the specific use . . . they are relatively light in weight for the heavy jobs they do. There's a Wirebound for every handling, shipping and storage need: industrial, chemical, agricultural. Wirebounds can be stacked high as you please, indoors or out . . . no slick surfaces to invite costly stacking or handling slip-ups either! Ship Wirebound . . . be assured of protection plus for your product!



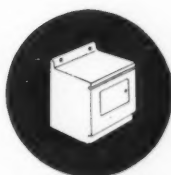
Write for informative booklet, "What to Expect From Wirebounds," or ask for a sales engineer to call without obligation.

**WIREBOUND BOX
MANUFACTURERS' ASSOCIATION**

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Wirebound
BOXES & CRATES

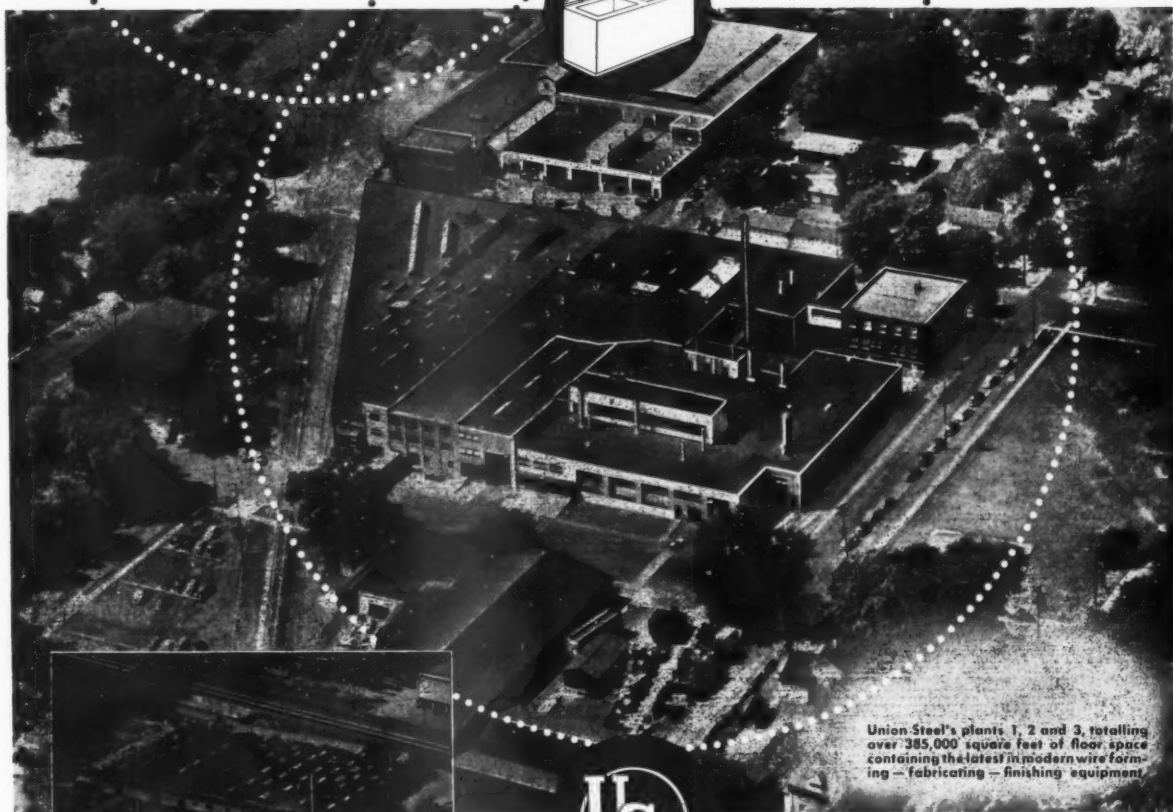
'PROVING GROUND'
FOR THE
APPLIANCE INDUSTRY



Since 1903, Union Steel Products Company has earned, on an ever increasing scale, a position of leadership in the design, development, manufacture and finish of welded wire components for all appliance applications.

Through a unique combination of creative engineering and manufacturing skills plus modern fabrication and finishing techniques, Union Steel remains the one experienced source that guarantees higher quality—with the lower cost—and on-time deliveries.

Remember, too, that the production facilities of not one, but two superbly equipped plants can be yours for the asking. Your 'proving ground' for the finest welded wire products available today. Why not phone Union Steel today?



Union Steel's plants 1, 2 and 3, totalling over 385,000 square feet of floor space containing the latest in modern wire forming—fabricating—finishing equipment.

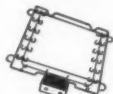


Union Steel's recent expansion, Plant #4, which contains an additional 84,000 sq. ft. of highly specialized wire fabricating equipment.



**UNION STEEL
PRODUCTS CO.**

ALBION, MICHIGAN



Oven Heating
Element Frames



Oven Racks



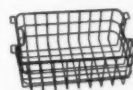
Oven Rack
Side Frames



Refrigerator
Shelving



Evaporator Shelves
and Condensers



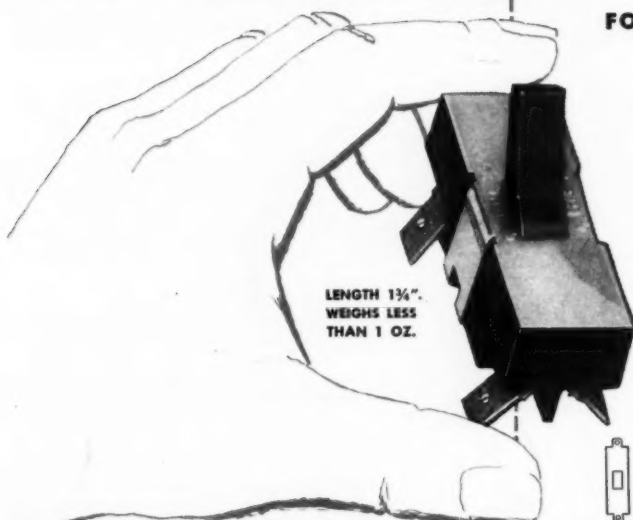
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Baskets



Swing-out
Refrigerator Baskets

New Exclusive **TEP** TOGGLE SWITCH

FOR APPLIANCE AND RELATED APPLICATIONS



LENGTH 1 3/4".
WEIGHS LESS
THAN 1 OZ.

BUILT-IN VERSATILITY—CAPACITY FOR
SINGLE POLE - SINGLE
THROW, OR SINGLE POLE -
DOUBLE THROW, OR
DOUBLE POLE - SINGLE
THROW, OR DOUBLE POLE -
DOUBLE THROW.

RATED 15 AMP.
@ 125-250 V.
A. C. ONLY.

SCHEMATIC VIEW
DOUBLE-POLE
DESIGN.

HEAVY-DUTY
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CONTACTS.

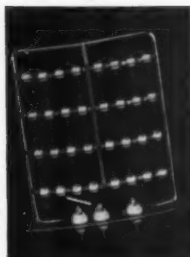
LONG LIFE CONSTRUCTION—
NEGATIVE-MAKE AND
POSITIVE-BREAK DESIGN.

QUICK-CONNECT
TERMINALS SPEED
CONNECTIONS.



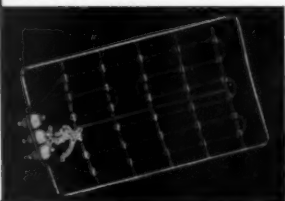
VARIETY OF MOUNTING BRACKETS
AVAILABLE TO SUIT NEEDS.

SPECIFY **TEP** HEAT FOR DEPENDABLE OPEN COIL ELEMENTS



The design and manufacture of "open coil" heating elements has long been a major TEP service to the appliance industry. TEP has pioneered many new and exclusive features now used by leading manufacturers. Call or write today for TEP design and engineering assistance on any job. There is no obligation.

Heating element, manufactured for Maytag Automatic Clothes Dryer Unit, includes TEP exclusive "floating construction" design that allows unit to "breathe."



A TEP manufactured unit for ABC Clothes Dryer features specially treated insulators that reduce micro-amp leakage to a minimum.



"Floating construction" is also included in Lovell Dryer Systems. TEP "Shur-Lock" insulator supports also guard against dislocating and subsequent electrical failures.

TEP *Products*

Simplicity of Design Insures Long, Dependable Service at Lower Cost

The unusual simplicity of the new TEP Toggle Switch design achieved by Tuttle Research Engineers, now provides a dependable, top-quality switch at lower cost. Considerably smaller than comparative switches offering the same variety of contacts, it includes provisions for four-way wiring connections. There are only 11 working parts and the complete switch weighs less than one ounce. Switch case and actuator are of durable Bakelite construction, providing adequate insulation from current carrying parts.

1/4 Million On-and-Off Engagements Without Failure

The new TEP Switch incorporates a negative-make and a positive-break design, and is constructed so that there is never less than two ounces of pressure on contact points. Tested on an automatic unit at 660 cycles per hour, 250,000 actuations have been recorded without failure. Further, the complete unit has proven stable under momentary high overload and is non-reactive to shock and vibration. Different mounting brackets can be provided to suit a wide range of appliances and instrument installations.

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